

Los Angeles

JUN 19 1935

PICKS and SHOVELS

By O. E. POTTER

Vol 30, No. 6

JUNE, 1935

\$1 a Year, 20 Cents a Copy

# Contractors and Engineers Monthly

## PICKS and SHOVELS

### Skilled Laborers Hit by Relief Labor

#### County Labor Agencies Must Be Discarded for Free Selection

By CHARLES B. COCHRAN,  
Dunney & Cochran Construction Co.,  
Marion, Ill.

**T**HREE are certain phases of the labor regulations for Public Works projects which are practical and well founded. Specific wage scales with minimum limits are quite acceptable for leveling the wage increment; control of payrolls receives no objections. No legitimate contractor has anything to hide, and these payroll reports are a protection to him as well as to the employees. But employment agencies and the mandatory selection of labor through these agencies strike at the very heart of the construction industry. If employment agencies are necessary to the political mind, their powers must be curbed to a point where they will not actually crucify the contractor.

#### "I'm Skilled" Means Nothing

It is absurd to assume that efficient labor can be obtained from unemployment lists, when these lists are confined to the limits of the county or the immediate vicinity in which the specific project to be built is located. The average employment agency is not qualified to select labor for an industry about which it knows nothing. The fact that a man applies at a relief agency, fills out a card, and registers himself as a skilled laborer, does not make him one, irrespective of the amount of insistence on his part or the agency's.

The contractor today wishes to select his own labor and build up his own organization without interference from outside sources. If allowed to do this he is willing to confine his selection to

#### S. R. O. on Old Bridge

There was an old narrow steel truss bridge, running parallel to the new one and only about 20 feet away, on which there were no sidewalks. The majority of the children attending a nearby grade school had to pass over the old bridge on their way to and from school, and fascinated by the work under way, they accordingly loitered in order to watch proceedings. Invariably they fooled around, pushing and shoving each other, laughing and giggling and shouting, and bad accidents were avoided only by a miracle.

Traffic over the old bridge was heavy and the danger of accidents to the children by cars worried the Project Engineer considerably.

#### No Aid from School

He went to the school authorities and asked their aid. Some remarks were made to the classes but to no avail. No school patrol was organized to police

(Continued on page 11)

#### In This Issue

Bonneville Dam	36
Bridges	5, 10, 27, 28
Bulletins and Pamphlets	38, 39
Contracts vs. Direct Labor	4
Dredging	12
Editorials	4
Equipment Maintenance	23, 36
Excavation	2
Grading	1
How the Other Fellow Did It	25
Lubrication	31
Relief Labor	1
Road Maintenance	16
Safety in Construction	4
Stabilized Roads	16, 35, 37
Tunnels	2
Welding	10

### Louisiana Contractor Laid Stable Clay Fill for Bridge Approach

#### Southwest and Midwest Contractors Optimistic

*There is a distinct feeling of optimism among contractors in the southwest and midwest states which I have recently visited on a two-months trip by automobile, inspecting more than 75 construction projects. Contractors feel that the extended Public Works Program means stability in the industry and have given evidence of their optimism through the purchase of a considerable amount of new heavy equipment.*

*General business conditions as evidenced by the fewer numbers of laborers available for construction operations from re-employment agencies seemed best in Texas but were generally improved in all of the states visited, which also included Oklahoma, Kansas, Missouri, Nebraska, Iowa, Illinois, Indiana, Ohio and Pennsylvania.*

Theodore Reed Kendall,  
Editor.

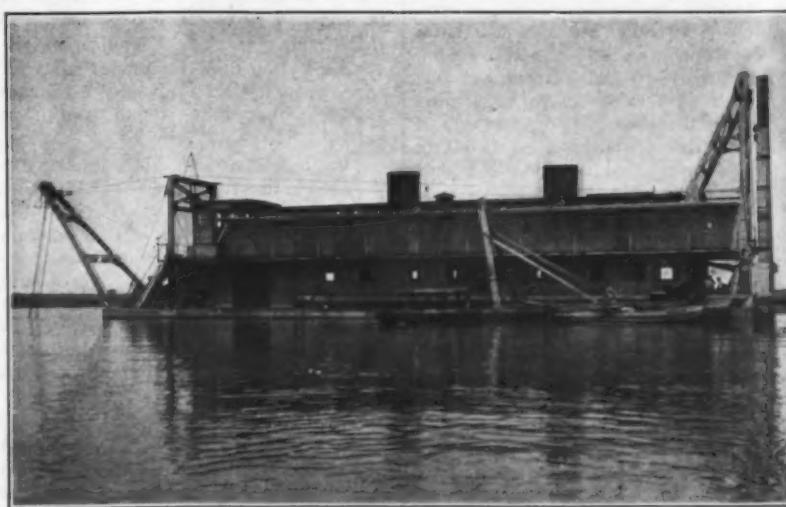
the State in which he is operating, and in so doing, unemployment, national recovery and the contractor will all benefit.

#### Hypothetical Case—A True Picture

The State is the political unit for the administration of unemployment relief. With this in mind it is difficult to differ.

(Continued on page 20)

#### DREDGE MANATEE DESIGNED BY A CONTRACTOR



The Manatee at Work on the Wilbanks & Pierce Highway Fill Contract Which Was Described in the May Issue. See Page 12 of This Issue for a Complete Description of the Dredge.

#### Well-Compacted Fill, Relief Opening Trestle Features of La. Contract of Robinson & Young

(Photo on page 44)

**T**HE ambition of every grading contractor is to produce embankment fills that won't settle, that show minimum shrinkage, and which can be paved immediately. This hope was fulfilled on a new approach to the Calcasieu River Bridge on State Route 42 connecting the two largest cities of their sections of Louisiana, Lake Charles in the southwest and Shreveport, in the northwest.

The Calcasieu River bridge, a vertical lift span, was built in 1924 with creosote pile approaches. The highway carries heavy traffic but was out of commission two months a year because of high water in the river which loops about the southern approach. Routine examination of the Oregon fir deck of the approaches showed that they could not be turned over and used again as had been expected and also that the caps of the bents had become structurally unsound in 10 years, in spite of creosoting. The trouble was dry rot, showing that probably the penetration of the creosoting of the initial caps was not sufficient.

It was decided that, while the bridge was not in use during the repairing of the bents and deck, it would be well to raise the south approach a maximum of 11 feet and carry it back to the existing grade, a distance of 5,600 feet. In addition a relief opening near the center of the fill, 800 feet long and involving another new trestle, was included in the contract, which was awarded to Robinson & Young of Baton Rouge, La., on May 3, 1934, for \$77,693.32 with an allowance of 200 working days. The work which was started May 18, 1934, was completed in March, 1935.

#### Operating the Borrow Pit

The contractor opened a 5-acre borrow pit about  $\frac{1}{8}$ -mile from the south end of the job, giving him an average haul of about 0.7-mile for the embankment material. The pit was started with a  $\frac{5}{8}$ -yard General Excavator shovel equipped with a 40-hp Buda motor loading to a fleet of ten  $1\frac{1}{2}$ -yard trucks; five Fords, three Chevrolets and two Internationals. The material was a good red clay similar to brick clay. The shovel worked in the pit until it had developed a 5-foot face and then the unit was converted to a dragline with a 42-foot boom and a  $\frac{3}{4}$ -yard Yaun dragline bucket. The dragline, which was run on top of the bank and the trucks below, permitting fast loading with a minimum of shifting of the

(Continued on page 15)

# Ingenious Methods Used in Driving Baltimore Tunnel

**C**ONTINUING its gigantic program of electrification of its main lines from New York to Washington, D. C., the Pennsylvania Railroad started the driving of the new Union Tunnel beneath the streets and houses of Baltimore in the late summer of 1933. The existing tunnel was all too small to permit electrification and so a contract was awarded to the Arundel Corp. of Baltimore for a 3,330-foot project, consisting of 950 feet of open cut at one end, 2,085 feet of shield-driven tunnel, the subject of this article, and 295 feet of open cut at the other end. As a matter of convenience, the 950-foot open cut end was referred to as the Washington end of the job, and the other as the Philadelphia end.

The features of the tunnel contract have been: the use of side drifts for the construction of the side walls on which the cast iron lining of the semi-circular main tunnel was set by a hydraulic erector without a counterweight; the methods of mucking; and the handling of the concrete by truck mixers, side-delivery hoppers mounted on standard-gage cars in the tunnel, and concrete pump delivering through pipes in well holes.

## Initial Work

The initial work on this contract was on the Washington end open cut, which was started in July, 1933. The 2,085-foot tunnel section was driven from a single shaft at Valley Street from the Washington end toward the Philadelphia end of the tunnel. The Valley Street shaft was 48 feet square, 54 feet deep and was excavated in August and September, 1933. The side-wall drifts were started October 23, 1933, and the main shield started on its journey January 15, 1934. The shield started in decomposed gneiss overlaying a hard hornblend gneiss but there was always some clay in the heading, some sand and a little water-bearing strata in the bottom of the drifts. These water-bearing strata were low in height and never more than 3 feet above grade. At times the tunnel proper ran into a full sand and clay face and at no time did the rock run more than half-way up the face.

The tunnel is on a 1.2 per cent grade, giving natural drainage throughout the work. Two 10-inch Poroswall pipe lines were laid 5 feet on either side of the center line in the tunnel and 8 feet either side of the center line in the open cuts for permanent drainage.

## The Side-Wall Drifts

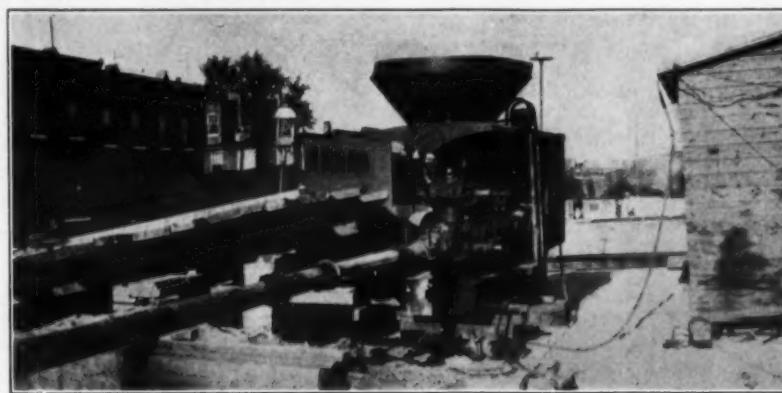
The driving of a semi-circular shield for the main tunnel brought up the problem of carrying the weight of the shield during driving. Several methods were considered. It was finally determined to drive two pioneer or side drifts, pour the footing and short side wall in the drift, leaving sufficient room to muck by the wall, and then support the roof shield on the walls. The side drifts were kept far enough ahead of the main tunnel to permit the concrete in the footing and side walls to have at least thirty days curing before carrying the shield for the main tunnel on rails set on top of the walls.

The side-wall drifts were driven 11-foot in diameter with full circular shields and progressed from 4 to 7 feet per day in rock and as high as 12 to 16 feet per day during April and May, 1934, when driving through sand, clay and gravel. The side drifts were temporarily lined with Truscon liner plates

## Pioneer Side Drifts, Semi-Circular Shield, Mucking and Concreting Features of Arundel Job

3/16-inch thick and paneled for strength. There were eleven plates for the full circle, each being 3.1416 feet long and 16 inches wide. Where the ground was good, the miners poled ahead for two shoves and the erection of two rings as soon as the drift was mucked out and before further excavation was started. The struts to carry the thrust of the hydraulic jacks were usually carried back four or five rings.

The hydraulic equipment for the



C. & E. M. Photo  
The Pumpcrete Unit Which Delivered Concrete Through Well Holes to the Side Drifts.

small circular shields consisted of eight 62-ton Watson-Stillman double-acting shield jacks with complete control valves for each of the two side drift shields. Each jack was fitted with a long self-aligning ram head, for equalizing the pressure on the liner plate flanges.

There were two miners, two helpers and four muckers for each drift. The muck was loaded by hand to industrial railway side-dump cars and hauled back along the drift to the shaft where the cars were raised one at a time by the electric elevator and dumped directly into a large hopper from which heavy-duty trucks were loaded to capacity, hauling the muck to a dump.

## The Main Tunnel

The inside diameter of the finished iron in the main tunnel is 33 feet at the spring line. The cast iron section is semi-circular with one 2-foot 9-inch tangent segment at the bottom on each side resting on the 8-foot 9-inch high concrete side wall. The distance from the top of the wall to the top of the tunnel invert is 6 feet. The invert was poured 2 feet thick in rock sections and 2 feet 6 inches thick in earth. The cast iron lining consisted of two sets of rings, designated as Ring R-1 and R-2, which were placed alternately. Ring R-1 consisted of the following segments: two "A", six "B", two "D", and one "K". Ring R-2 was made up of: two A, five B, two C, and one K. All segments were 30 inches wide, with 14-inch flanges and 1½-inch walls. Segments A and B measured 78.858 inches long and were identical, except that Segment A had a non-radial face to permit the insertion of the inverted key segment K at the top. This key segment was 13.143 inches long. Segment C measured 2 feet 9 inches along the tangent and 39.429 inches on the arc, or a total of 72.429 inches. Segment D, the end tangent section, was

2 feet 9 inches long. Each segment, except D and K, had five holes for 1¾-inch bolts at each end and holes for six 1¾-inch bolts along the side for bolting to the adjacent ring. Segment D had only three instead of six bolts for attaching to the adjacent ring and Segment K only one bolt. Each segment had one 3-inch grout hole threaded for pressure grouting around the outside of the metal sections of the tunnel.

An Ingersoll-Rand air wrench was used for setting the segment bolts which were tightened to final set against two hemp rope grummets impregnated with red lead by a 4-foot hand ratchet wrench operated by two men. The caulking slot between the segments was ¼-inch wide and 1 inch deep. Into this 5/16 x 1/2-inch and 3/16 x 1/2-inch lead was caulked by pneumatic tools.

## The Main Tunnel Shield

The main shield, 36 feet 1/4-inch in diameter, was equipped with twenty 200-ton hydraulic jacks operating under 5,000 pounds per square inch pressure. The shield carried eight tables, three above and five below, the bottom center table having two jacks, because a single

jack could not be centered at this point where the hydraulic erector was stalled.

The shield was built with a short tail which covered the last ring only 1½ inches after a 30-inch shove. On a good face, 8 x 8-inch soldiers with 2 x 10-inch face boards were used. The excavation from the face ran 27 cubic yards per linear foot. On the shield, there were eight miners, with eight helpers and five shield muckers with one shield driver for each shift. As the main shield advanced, the top two or three lining plates of the side tunnels were removed.

The hydraulic erector was of special design, adapted for use in a shield of semi-circular section. Since excavation extended only a few feet below the center line of the shield, it was impossible to use any counterweight on the erecting arm. The erector and the control for the erector was therefore redesigned by the Watson-Stillman Co. and proved successful. The erector handled with accuracy and safety segments weighing 2,500 pounds at a radius of 17 feet with full control circumferentially and radially. The erector was used at one point to handle a 2-ton jack at its full extension of 17 feet.

The shield pulled a trailing platform which carried a Union Iron Works pressure grouting machine which was used to grout after the placing of each ring. An accelerator was used with the grout so that it would set up again the header quickly, and not delay the placing of the next ring. There were three of these grouting machines on the job, one for each drift and one for the main tunnel. Each machine handled 1 cubic foot of grout per charge, using the full line pressure of 100 pounds of air for placing. No gravel packing was used around the rings.

## Hydraulic Power Equipment

The hydraulic power pumps, accumulator and one of the air compressors  
(Continued on page 8)

## Excavation—Wet and Dry

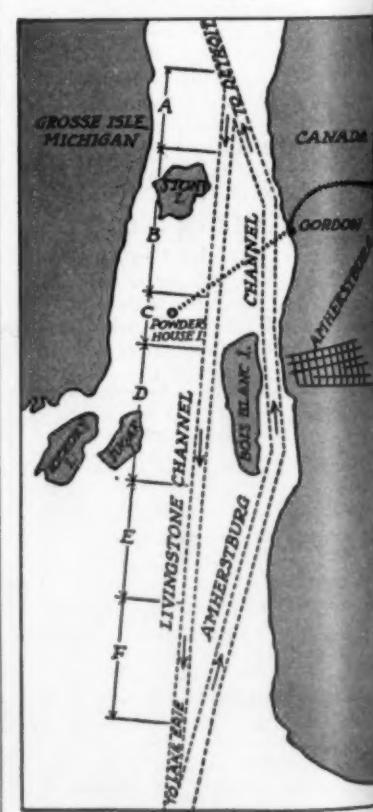
### Livingstone Channel of the Detroit River Cleared with Dynamite to 28-foot Depth

IMPROVING the Detroit River, Michigan, to take care of navigation is nothing new. As early as 1877 the first work of this kind was undertaken. Up to the time of the World War, the Livingstone Channel for southbound ships and the old Amherstburg Channel represented an expenditure of more than \$10,000,000. The first project called for a channel 600 feet wide, 21 and 22 feet deep; the second, for a minimum width of 300 feet and a depth of 22 feet, except in the area, now called Section B, where more width was required.

Between 1918 and 1925 other sections of the Livingstone Channel were widened, but within a few years it became apparent that more depth would be needed.

The importance of this water way is shown by the fact that in 1933 cargo more than three and a half times the tonnage carried through the Panama Canal and considerably more than twice the total reported for the Suez Canal in that year was carried through the bottle-neck of the Detroit River. In 1929, the banner year, more than 110,719,000 tons of coal, iron ore, wheat, pig iron, limestone and other bulk commodities were transported.

On May 5, 1932, bids were received by the U. S. Bureau of Engineers for the further improvement of this channel at a point starting about 9 miles below Detroit and extending into Lake Erie. The accompanying sketch shows the



A-C-F—Excavated in the Wet  
B-D-E—Excavated in the Dry

## Aerial camera "shoots" NEW YORK CITY'S newest TEXACO ASPHALT pavement



Bay Street in the Borough of Richmond, New York City, sees plenty of hard service, as the photograph plainly indicates. A rough-riding, noisy cobblestone pavement last year, it is now smooth and resilient through resurfacing with TEXACO Asphaltic Concrete.

With this project, New York City raises to 2,000,000 square yards the TEXACO Asphalt paving laid on its streets during the past quarter-century.

Back of this impressive showing in America's leading city will be found among other things a close cooperation with contractors. All TEXACO employees are well schooled in the importance of perfect teamwork with contractors' organizations on TEXACO road and street projects.

### THE TEXAS COMPANY Asphalt Sales Dept. 135 East 42nd Street      New York City

Chicago  
Cleveland  
Kansas City  
Houston

Dallas  
Buffalo  
New York

Philadelphia  
Richmond  
Boston  
Jacksonville



Air view taken during resurfacing of old cobblestone pavement on Bay Street,  
Borough of Richmond, New York City, with TEXACO Asphaltic Concrete.



# Contractors and Engineers Monthly

THE NATIONAL BUSINESS MAGAZINE OF THE CONSTRUCTION INDUSTRY

Issued Monthly by Buttenheim-Dix Publishing Corp.

Publication Office: Mount Morris, Ill.

Editorial Office: 470 Fourth Avenue, New York City

TOM DIX, President  
EDGAR J. BUTTENHEIM, General Manager  
MYRON MACLEOD, Advertising Manager

THEODORE REED KENDALL, Editor  
GEORGE CONOVER, Vice President  
HERBERT K. SAXE, Treasurer

BRANCH OFFICES  
Chicago, Ill., Daily News Bldg.; Tom Dix, President  
Cleveland, Ohio, 448 Hanna Bldg.; George Conover, Vice President  
San Francisco, Calif., 907 Mills Bldg.; Duncan A. Scott

## Profit, Prices and Equipment

"Sorry we are not running this afternoon, but the boom cable snapped this morning and just missed a man in the mud. We thought it would last until noon anyway," said the Superintendent in explaining the fact that on the second fine day in two weeks his concrete paving crew was laid off.

"We were going fine until the drive gave way on the grader last night and we can't get another 'till tomorrow," reported another contractor. And a third in as many days bemoaned the fact that his trucks were dropping out continually with one trouble after another.

What is the explanation? Inquiries brought out the fact that the paver had long since earned its way clear and should have been in the junk heap two years ago. Why didn't the contractor put it there and buy another?

"Bidding is so close these days that if you can make an old piece of equipment hold on a year or so longer until things pick up, you can bid in the jobs a little lower because you have nothing to charge off on the paver," was the candid answer of the Superintendent.

The continued lost time on that particular job, which was bid very close,—too close,—practically cost the contractor every cent of profit and allowed him nothing to pay for moving the machines back to his own state. Perhaps he will leave the paver there, let it rust and then buy a new one for the next job. The contractor's answer to that is that the jobs are not long enough or numerous enough and he cannot get enough to make his required payments in the first year. He will find that before the end of this construction season the man who has the new equipment will be on top and he will have lost out because he worked his machines far beyond their economic life.

Bidding low on the strength of the fact that the machine owes the contractor nothing reminds me of the story told by the son of one of the big old-time printers in New York City. One of the Big Five found that his presses could handle a little more work without increasing his overhead and with very little cost for operation. His regular business was carrying all the overhead and operating costs of the plant so why not get that additional profitable business. He went out and gathered in some business at very low rates from customers of a couple of his competitors and was sitting pretty until one of the other printers discovered the same idea and

acted on it. But he took some of the old regular backbone business from the first house. Then another plant which had lost to both the first plants decided it would be necessary to cut its prices a bit to retain its business and to get some new accounts.

Thus the vicious cycle went on until they waked up to the idea that they had done nothing more than present their customers with lower prices and ruin their own business. Try substituting contractor for printer and you will find a close simile to conditions in the construction industry today.

## Choose Your Cements for the Service You Want

Just as an engineer can choose steel of varied characteristics and tensile strength, depending upon the service to be made of it, he can now specify similarly the type of cement to suit conditions. There is a marked trend in this country away from the use of one standard type of cement for all construction projects. P. H. Bates of the U. S. Bureau of Standards pointed out in his paper before the American Concrete Institute in February that consumers are demanding more types and more varieties of cement within any one type of cement to meet the requirements of special construction projects.

There is a standard portland cement used in the majority of cases which is covered by the A.S.T.M. and Federal specifications; there are low-heat-of-hardening cements, such as are being used for Hoover Dam; there is portland cement to resist sea water and other waters containing destructive salts; and the high-early-strength cements used by almost every state highway department and many municipalities.

The increasing use of these cements is bound to result in better concrete. The project on which the cement is to be used must be carefully studied to determine whether a saving will result from the use of a special cement which will cost more than the standard portland cement but which may speed up construction, make possible a lighter structure, or lengthen the life of the structure.

Mr. Bates called attention to a large concrete bridge recently completed in France in which a high-early-strength cement was used because the designer found from tests that by so doing, he could use lighter sections than if he employed the cheaper but lower testing portland cement, which resulted in the higher-priced cement yielding the lower cost bridge.

feet,—or too far away. When you are through with the tool, put it away where it can do no harm.

When picking up or putting down a cross-cut saw, keep the teeth pointing away from you. Carry it on your shoulder the same way. Walk carefully and keep an eye out for anyone who might be close at hand. Do not turn corners fast. When through with the saw put it away on a rack flat against the wall, set so that it can't be knocked off.

## Practice of Charge for Plans Unsatisfactory but Necessary

To the Editor  
Contractors and Engineers Monthly

We have not made charges for plans and specifications until recently but on the last three jobs have asked for deposits and have refunded all but four or five dollars upon return of the plans. This is just about the actual cost of furnishing them.

We do not like this and think that the proper method is for the city (or owner) to furnish plans without cost. They must require a deposit in order to have them returned. The difficulty with this method at the present time is that there is a very large demand for plans, often from contractors and others who do not bid. The cities can not restrict the distribution of such plans and we think the practice of making charges has been brought about in an effort to avoid the distribution of plans not ordinarily needed.

We always make plans available at offices such as Dodge Reports and the Illinois Architects Construction Service, and we furnish considerable information on specialties or equipment items to those interested and furnish them lists of contractors so that they may quote them.

The proper solution of this problem seems to depend on the cooperation of engineers, contractors, and material men.

J. J. Wolmann  
CONSULTING ENGINEER

Bloomington, Ill.  
May, 1935

## Other Engineers Uphold Charges for Bids

To the Editor  
Contractors and Engineers Monthly

With reference to our own work, which has been in the past several years PWA, and since the established engineering fee to the client has remained unchanged, we find that for jobs under \$50,000 we are compelled to charge for plans and specifications if taken out.

Recently we had a job which aggregated \$30,000. Nineteen contractors took out plans and specifications. Besides this number we had to furnish five sets to PWA state and city officials. On letting the contract to the several low bidders, it was necessary to furnish an additional four complete sets and six copies of bond, proposal, etc., for each contractor, to the PWA.

At the current price of blue printing in Chicago under the NRA and as our specifications average 130 to 150 pages, you will agree if the engineer is to assume this cost on these small jobs there is nothing left.

We have our plans and specifications on file in the City Clerk's office of the city interested, and in our own office. Every contractor is invited to inspect the plans and specifications at either place and determine if he wishes to bid. If the plans are taken out, we assume that he is interested. When he has taken out the plans, they are of no further value to us, and the return of these is of no value, as the successful bidders never use over one additional set of plans and specifications. We therefore have fixed an unreturnable charge for plans and specifications on jobs under \$50,000.

Charles De Leuw & Company  
CONSULTING ENGINEERS

Chicago, Ill.  
May, 1935

To the Editor  
Contractors and Engineers Monthly

In regard to a charge for contract plans and specifications, it is our practice to make such a charge, allowing bidders a rebate of one-half the cost, providing such are returned within a reasonable period.

## TOOLS DON'T CAUSE ACCIDENTS



IT'S THE PEOPLE WHO MISUSE OR MISPLACE THEM

NATIONAL SAFETY COUNCIL

## Public Funds Saved By Contract Method

Public funds are more wisely and economically expended in the highway field by the use of the contract method, said Joseph A. Tomasello, recently elected Treasurer of the New England Road Builders Association, in an address at the annual meeting of the Association.

For the purpose of comparing the relative efficiency of contract and day labor highway work, the Bureau of Public Roads last year required each state to undertake at least one project by the direct-labor method. Bids were taken from contractors in the usual way and the project was selected after the taking of the bids, thereby providing a set of contractor's prices on that particular project with which to make comparisons.

A complete and accurate cost record of this test project in Massachusetts was obtained, and the final result showed that the total cost of the direct-labor work was 45 per cent greater than the cost of the project would have been if done by the contractor at the prices he submitted. The state's total cost was \$104,015.64 as compared with a cost of \$71,708.03 if the work had been done by contract.

It has been reported that the direct-labor test project in Rhode Island cost over 100 per cent more than if it had been done by the contractor.

"The fact that the cost of day labor work as compared with contract work is much higher, as proved by the results of these test projects, is not new. But the conduct of these test force-account projects under conditions making for a fair comparison and the development of reliable figures of comparative costs, was of great value, and should discourage public officials who are interested in economy of expenditure of public funds from carrying on day labor operations in the highway field," Tomasello said.

In addition to furnishing plans and specifications, bidders' forms, and blanks for statements required by various state agencies, we furnish a service to contractors and material and equipment companies, making available to contractors information as to where materials and equipment may be purchased, and supplying material and equipment firms up-to-date lists of contractors.

During the time of advertising important projects, as many as two hundred letters a day are sent out from our office in connection with the above. This is appreciated by contractors and material men and it is very seldom that we receive a complaint as to the cost of plans and specifications or as to the amount to be rebated upon their return.

Charles H. Hurd  
CONSULTING ENGINEER  
Indianapolis, Ind.  
May, 1935

# Its Composite Pile Trestle Structure

(Photos on page 44)

THERE were three pile trestle sections to the Apalachicola Bay bridge, one 1,500-foot section as an approach to the main river crossing; a 3,000-foot trestle with concrete deck at about the center of the crossing and a 9,394.71-foot section toward the East Bay shore. The contract for the construction of the pile trestle sections with concrete deck and pre-cast concrete hand-rails was awarded to Doullut & Ewin of New Orleans, La., for \$681,748.19. This article will deal entirely with the composite piles and the driving of the 5-pile bents on 25-foot centers with a floating and an overhead pile driver. The next article, the third in this series, will cover the concrete plant and the manufacture of the hand-rails in the contractor's yard.

The deck of the trestle is 18 feet above mean water while the embankment is only 6 feet above mean water, making it necessary to have a transition section of a vertical curve from the trestle section to the embankment. The average depth of water for the crossing is 4½ feet with a maximum of 8 feet and a channel of 26 feet where the swing span bridge is built. These depths had considerable effect on the method of driving the piles as it was necessary to build an overhead pile driver to handle some of the driving near the Apalachicola shore because the floating driver could not get in. The overhead pile driver insured early completion of driving, thus releasing about half the contractor's floating plant.

#### The Bridge Deck

The concrete deck of the bridge carries a 24-foot roadway between curbs with an 8-inch slab. The curbs are 9 inches high, 16 inches wide at the top and carry the hand-rail with posts 10 x 12 inches in section. With the bents spaced 25 feet on centers and the I beam stringers 50 feet long the expansion joints are placed at alternate bents where the posts are 10 x 18 inches in section. The expansion joints are ¾-inch. The I beams are Carnegie section 21 inches high and weigh 58 pounds per foot.

#### The Composite Piles

The composite piles consist of a treated top section approximately 40 feet in length, with a 9 to 10-inch tip and a 12 to 14-inch butt measured 3 feet from the end, spliced to an untreated pile with an 8-inch tip and a 9-inch square butt. These untreated piles, which remain always beneath the bed of the Bay, vary in length from not less than 20 feet to 45 feet. In preparation for joining, both the untreated and the treated pile were squared carefully at the abutting ends. The butt of the untreated pile was cut accurately to a 9-inch square for forming the connection, and a ¾-inch round dowel 12 inches long was placed, centered, in the butt to run half its length into the treated tip. A 3/16-inch plate, 8 inches square with a hole in the center for the passage of the dowel was placed between the two sections of the pile. Four 3 x 4-inch oak splines 3 feet 4 inches long were bolted with ½-inch bolts to the piles with four bolts in each pile, two each way at right angles. When driven the pile splice was at about Elev. —25.

The piles were handled by a 35-ton American locomotive crane in the contractor's yard at Apalachicola where three men per shift with an electric drill made up just enough joints to take care of the requirements of the floating pile driver. It was necessary to have a large number of piles with varying lengths of untreated sections because of the requirements of driving. The required

#### Doullut & Ewin Used Floating Pile Driver and Travelers for Caps on Apalach. Bridge

lengths of piling ordered by the foreman of the floating pile driver were loaded on a barge and taken out to the pile driver each morning. All splices were tightened up before driving as the bolts might have become slightly loose during handling in the yard and from the barge to the leads of the driver.

#### Conditions To Be Met In Driving

According to the contract and the specifications the trestle piles had to

meet five conditions, some of which were a bit contradictory: 1. The piles had to have 15 tons bearing; 2. The maximum driving was limited to 18 tons, unless otherwise permitted by the Engineer; 3. The splice had to go 20 feet below ground surface; 4. The untreated pile if driven more than 3 feet after the 15-ton-bearing was reached by the Engineering News formula, was paid for at 10 cents per linear foot; 5. If the treated pile went below the specified splice elevation it was paid for at one-half the unit price for all over-driving.

#### The 5-Pile Bents

The bents of five piles each were driven with the center pile plumb, the two intermediate piles on a batter of ¾-inch per foot, and the two outer piles on a batter of 1½-inch per foot. The piles were cut off horizontal after being pulled into place by methods to be described later, treated with two applications of hot creosote oil and one of hot pitch and then each individual pile

(Continued on page 17)



C. & E. M. Photo  
The Floating Pile Driver as Seen from a Pile Barge Alongside

# NORTHWEST

## *The outstanding ½ and ¾ Yd. Shovel!*



### Compare them Point by Point with Other Machines



Northwest ½ yd. and ¾ yd. shovels are big full sized, heavy duty machines not to be compared with the average small shovels offered by other manufacturers.



- Both upper and lower machinery frames are heavy steel castings.

- They steer with full power on both crawler belts while turning, as well as when going straight ahead.

- All high speed shafts roll on ball or roller bearings.

- The power take-off is the equivalent of the finest speed reducer—helical cut gears running in oil.

- The "feather-touch" clutch control reduces operating fatigue, speeds up operation and increases output.

- Full convertibility permits meeting every problem.



Shovels, Cranes  
Draglines  
Pullshovels  
Skimmers

Built in a Range of 10  
Sizes — 1/2 Yd. Capacity  
and Larger

Outstanding value at a price  
within reach of your  
pocketbook!

Ask about prices  
before you  
buy!

**NORTHWEST ENGINEERING COMPANY**  
1727 Steger Blvd., 28 East Jackson Blvd., Chicago, Ill.  
Please send me complete information on machine checked:  
 Shovel    Crane    Dragline    ½ Cu. Yd.    Pullshovel  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_



A Pioneer Duplex Plant in Operation by Racine County, Wisconsin

### Crushing, Screening Plant Has Many New Features

Bottom-deck feed; shaft and gear drive, eliminating long chains; anti-friction bearings throughout; and belt-conveyor return of the crushed material are some of the features of the new Pioneer 15-35 duplex crushing, screening and loading plant, made by the Pioneer Gravel Equipment Mfg. Co., 1511 Central Ave., Minneapolis, Minn. This new plant has a capacity of 150 to 200 tons an hour.

The bottom-deck feed of this new plant feeds the primary and secondary crushers to capacity constantly. The swivel drive on the feeder conveyor permits feeding from any angle within 180 degrees, increasing flexibility and efficient shovel operation. The material flow allows all undersized gravel in the pit-run material to be screened out immediately without passing through a scalping screen and passes all oversize material directly to the jaw crusher. The finished crushed material passes through the top deck onto the blank middle deck and directly to the mixing hopper.

Steady crushing is secured by the Pioneer design for flow of material. The work of the two crushers is balanced automatically by the jaw crusher without changing the screen plates and even sticky materials flow smoothly over both decks and through the jaw crusher to the roll crusher, which can produce from 75 to 90 tons an hour of 1-inch minus material.

For returning the crushed material from the jaw and roller crushers to the top screen deck, a belt conveyor is used instead of a bucket elevator.

The Pioneer shaker screen pan is carried on six SKF anti-friction bearing hangers. The drive to the screen is by means of the single overhead eccentric, also SKF-bearing equipped and fully enclosed.

The entire plant is of rugged construction, with anti-friction bearings throughout. Timken bearings are used on the roll crusher, conveyors and

### 105 SPEED KING

2-Bag End Discharge Mixer discharges direct or with swinging spout, beats all records for mixing and placing concrete.



THE JAEGER MACHINE CO., 201 Dublin Ave., Columbus, O.

wheels, and SKF self-aligning roller bearings on the jaw crusher and shaker screen. There is a multiple V-belt drive from the jaw to the roll crusher, and a two-strand, high-speed roller chain from the crusher to the shaker screen. Both feeder and delivery conveyors are driven by shaft and bevel gear drives. The moving weight of the plant is approximately 56,000 pounds.

### Specially-Processed Wood for Concrete Forms

Laminex Plyform, a specially-processed wood which is smooth, light, rigid and unaffected by climatic conditions, developed for use as forms in concrete construction, is made by the Wheeler Osgood Sales Corp., 122 So. Michigan Ave., Chicago, Ill.

Plyform is designed for economical and efficient concrete form construction. Its laminated cross grain makes it warp-resistant and spit-proof. When specified, it is treated with a special waterproofing fluid to form a surface which eliminates moisture absorption and slips readily from the concrete when the form is removed.

Due to the nail-holding power of Laminex Plyform, fewer and smaller nails need be used, making salvage easier. It is claimed that Plyform may be used over and over again, the average running from four to ten re-uses, but often as much as twenty-two.

Wheeler Osgood Sales Corp. offers a special service to help contractors with their problems of concrete forming. Such help, together with further information on Laminex Plyform and its uses, and samples, will be furnished free upon request.

### St. Louis Distributor Displays 1935 A-C Line

The Joseph Kels Tractor & Equipment Co., St. Louis, Mo., has had on display in its show rooms at 1510 North Thirteenth Street the full line of 1935 Allis-Chalmers tractors and graders, which embody many new features and improvements, including the A-C oil-burning engine.

The Kels Co., of which Joseph Kels Jr. is President; L. May, Secretary and Treasurer; and Lyle W. Johnson, Sales Manager, has a sales force of ten men and handles all types of contractor equipment and supplies. It also handles used equipment, carries a full line of parts and offers 24-hour service.



**White and Indiana trucks offer most complete line in industry—a capacity and price to meet every requirement better at lower cost**

### 45 WHITES MAKE GREAT RECORD AT FORT PECK DAM

The Ft. Peck Dam, Montana, is the largest earth fill dam in the world—involved in an expenditure of \$87,000,000 and the hauling of 12,000,000 yards of dirt, most of which is bear paw shale.

A fleet of 45 Whites, operated by Spillway Builders, Inc., is used on this job. The White Model 718, above, operates on a 10-minute cycle from shovel to dump and back, 240 miles a day.

The complete White-Indiana line includes:

**WHITE TRUCKS** starting at \$1195 (chassis at factory); ranging from 8,000 to 40,000 lbs. gross and including 4 and 6 wheelers, trucks and tractors.

**INDIANA TRUCKS** at \$695 (chassis at factory) 11,000 lbs. gross and \$795 (chassis at factory) for tractor, 14,000 lbs. gross. Also 4 and 6-wheel drive Indians, 10,000 lbs. to 40,000 lbs. gross and 2 Diesel-powered Indians, 22,000 lbs. and 28,000 lbs. gross.

The White Branch or Dealer in your city will be glad to give you complete specifications. Be sure to see the White-Indiana line before you buy.

**THE WHITE MOTOR COMPANY • CLEVELAND**

**White AND INDIA TRUCKS**

## Advertisement

**Development of Speed in Power Shovels**

In the development of power shovels, the first of which were built some fifty years ago, speed and more speed has been the constant goal, for it is chiefly through speed that cost of work is lowered.

The first shovels, designed for railroad work and called "Railroad Shovels," were built on flat cars, and were, according to present standards, of rather crude design. Their operating mechanism was simple but effective and permitted the boom to swing through only 180 degrees, or a half swing. Railroad cars were used for removing the excavated materials.

**First Step Toward Increased Mobility**

The next step toward saving time was to mount the shovel on flat-tired traction wheels. This was an improvement but, where the traveling was rough or the ground soft, it was necessary to provide a floor on which the shovel could travel. The use of these floors or mats, as they were termed, was cheaper than railway tracks but tracks were still necessary and time was lost in trying to keep the railway cars, still used to remove the dirt, within reach of the shovel.

**Full Swing Design Due to Temperamental Mule**

To increase the mobility of the outfit, teams and wagons were next used to serve the shovel. While this overcame the lack of mobility of the dump cars, difficulty was experienced in spotting the wagons within easy reach of the dipper. Then came the full revolving shovel to bridge the distance between the cut and the vehicles. Less time was required to swing the shovel through a long arc than to back the mules and spot the wagons accurately within close reach of the shovel. Indeed, we might say that the full-swing shovel design was brought about by the temperamental mule.

**Crawler Track Introduced**

The crawler track was first used around 1916. It represented a long step in improving the mobility of the shovel and in permitting maneuvering in the cut. The time lost in this operation was reduced by from 80 to 90 percent. Coincident with this improvement came the gasoline motor and many minor developments, all of which made the shovel a more effective and versatile tool. Its speed was increasing.

**Three-Quarter Swing Design Increases Speed**

The latest step in the achievement of maximum speed, increased mobility, and low cost of shovel excavating came with the introduction and development of the modern three-quarter swing shovel—a development made possible through the use of motor trucks for hauling away the excavated material. The ease and speed with which motor trucks can be spotted exactly where desired made the full-swing design no longer necessary.

The three-quarter swing shovel was developed by Austin engineers after a careful analysis of the advantages and disadvantages of the full-swing design. They found that, with motor trucks in such general use, the full swing was of no practical advantage except on very special work. They also found that the substitution of a three-quarter swing enabled them to design a shovel of less weight and faster production speed—one that was easier to handle and would reduce digging costs. The results of these studies, together with other important improvements, were incorporated in the Badger Shovel.

## Advertisement

Elimination of the full-swing design made a turntable between the car body and the traction unit unnecessary and this not only lowered the center of gravity but also simplified the construction and greatly reduced the weight without any loss in effectiveness. The machinery deck was made stationary and the formerly necessary tail used to counterbalance the dipper was eliminated. To compensate for any lack of full swing, crawler tracks that permitted quick and easy shifting of the shovel were designed. By building the crawler tracks and the machinery deck as a rigid unit, the entire weight of this unit is utilized as a counterweight for the shovel and its loads. Its weight is greater and more effective than that of the revolving deck of the full-swing shovel.

**Three-Quarter Design Speeds up Boom Swing**

Since the boom on the three-quarter

## Advertisement

design is carried on a small rotating table, it follows that, when the boom is swung, there is nothing to be moved except the boom and its dipper and the small table. The weight of these parts is less than 25 percent of the total weight of the shovel as compared with 65 percent of the shovel's total weight which must be swung in the case of the full-swing shovel. It is quite apparent that power is saved and that swings can be started and stopped much more quickly. In short, the Badger Shovel weight has been reduced more than one-third of that of full-swing shovels of about the same capacity.

**Anti-Friction Bearings—No Cab to Restrict Vision**

Two other features which contribute to faster production speed are anti-friction bearings throughout and the placing of the operator out in the open where every part of his work is visible

## Advertisement

at all times. There is no enclosed cab to restrict his vision and cause him to slow up his swings to avoid accidents.

To offset the lower machinery table, it was necessary to compensate for the loss of boom height. Otherwise the shovel could not dig or dump at heights required for efficient work. This was accomplished by using a curved boom instead of the old style straight boom. This simple expedient permits dumping at even higher points than other types of shovels.

**Departure From Traditional Design**

Thus, by departing radically from traditional design as established by the early "Railroad Shovels," the Badger Shovel permits a faster cycle of operations, gives greater speed of output; lowers the cost of moving dirt and because of better fundamental design, requires less expenditure for maintenance and repairs.



**more power  
less swinging weight**

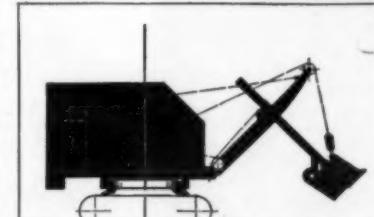
• Speed of operation has always enabled the Badger to compete with larger shovels in capacity per hour.

Those familiar with the Badger's operating principle (see diagram) will readily see how a reduction of dead weight and an increase in the power of the motor has given this new unit a capacity, both in speed of digging and loading, far ahead of any other similar equipment.

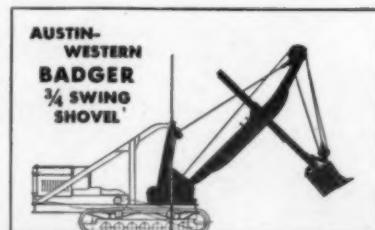
Through the use of alloy steels in boom, dipper stick, and bucket the dead weight of these parts has been reduced. This saving in addition to the increased horse power makes it the ideal tool not only for speed of operation but for rapid transportation and easy handling. Can be furnished with a half-yard bucket at slight extra cost.

Write for details on the engineering features of this machine which make it the big producer at low operating costs.

**The Austin-Western Road Machinery Co.**  
Home Office: Aurora, Ill. Cable Address: AWCO, Aurora  
Branches in Principal Cities



The essential difference between these two shovel designs is whether the counterbalancing weight must be moved at every swing or can be used effectively while standing still. Notice that in the Badger the boom is counterbalanced by idle weight. Fast starting stopping without waste of time and force to brake the momentum are achieved.



ROAD GRADERS • MOTOR GRADERS • ELEVATING GRADERS • DRAGS

ROAD ROLLERS • BITUMINOUS DISTRIBUTORS • ROAD-MIX MACHINES • CULVERTS

SCARIFIERS • BULLDOZERS • TRAILERS • SCRAPERS • PLOWS

CRUSHING AND WASHING PLANTS • SWEEPERS AND SPRINKLERS • SHOVELS • CRANES • ETC. • SNOW PLOWS

# Austin-Western

The Austin-Western Road Machinery Co.  
Y, Aurora, Illinois  
Please send complete information on the new  
Badger Shovel.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
DUMP CARS

STORY PRICE

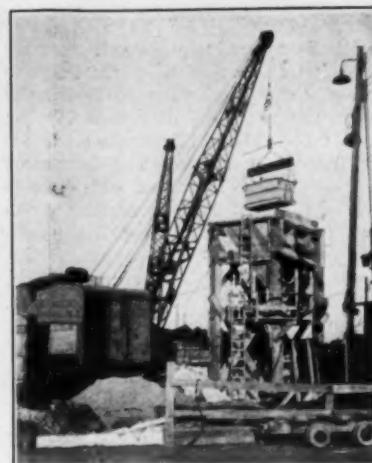
## Methods of Driving Baltimore Tunnel

(Continued from page 2)

were housed in a 70 x 14-foot galvanized iron house with a high center section where the accumulator stood. The electrical shop was located in one end of this house. The hydraulic power house equipment consisted of one Watson-Stillman 28-gallon per minute horizontal four-plunger pump operating at a nominal 5,000 pounds pressure and driven by a Crocker-Wheeler 100-horsepower motor, and a second similar pump of 10-gallon per minute capacity driven by a Westinghouse 40-horsepower motor. These pumps were capable of operation at 10,000 pounds pressure but on this contract all hydraulic equipment performed satisfactorily at about 5,000 pounds.

The larger pump was run continuously, idling on the line except when hydraulic power was being used when it immediately made up any loss of water drawn from the Watson-Stillman hydro-pneumatic accumulator which had a 42-inch air piston, an 8-inch hydraulic ram and a 48-inch stroke. With the 42-inch air piston under an air pressure of 200 pounds per square inch, a downward pressure of 277,000 pounds was produced on the hydraulic ram equivalent to a dead weight of 138½ tons. The hydraulic pressure would be, therefore, 277,000 pounds divided by 50, or 5,540 pounds per square inch. The hydraulic pressure was lowered merely by reducing the air pressure. The air is bottled up in the reservoir and in the air cylinder of the accumulator and is not discharged. Therefore, it was necessary to have only a small air compressor which was used for initially charging the system with compressed air and for compensating for any slight leakage that might occur.

The accumulator was used as a reservoir for water under pressure, receiving the constant delivery from the pumps and delivering it intermittently to the shield line, according to the demands for pressure water. The accumulator moving parts actuated two trip mechanisms, each of which controlled the operation of the suction valves on one of the pumps. Thus the pumps, while running continuously, delivered water to the accumulator only when needed to maintain a sufficient capacity in reserve. The hydraulic equipment in the power house required the attention of but one man for each of the three regular 8-hour shifts.



*C. & E. M. Photo*  
**Dumping Muck Box at Philadelphia End**  
 After Completion of Side Drifts.

### The Pneumatic Equipment

The pneumatic equipment for furnishing air for all drilling and for the operation of the concrete pump and grouting

machine consisted of three 810-cubic-foot Ingersoll-Rand Imperial compressors, one of which was located in the hydraulic power house and the other two in a separate structure. For all drilling, Ingersoll-Rand S49 drills were used with 1-inch hex steel. The maximum steel used was 10 feet for 8-foot holes in short sections but most of the work was done with 6-foot steel. From 16 to 30 pounds of 40 per cent du Pont dynamite was used for each hole, with delays. All shots were covered with manila mats in the tunnels. The blasting was restricted to light shots because of the proximity of the old tunnel and the nearness of old brick structures above the tunnel.

### Mucking the Main Tunnel

The main tunnel was mucked with a Conway mucking machine with one operator for each shift. There were four hand muckers who cleared the track and hooked the industrial railway cars to the "cherry picker" which had an operator in a cab near the top of the tunnel. The

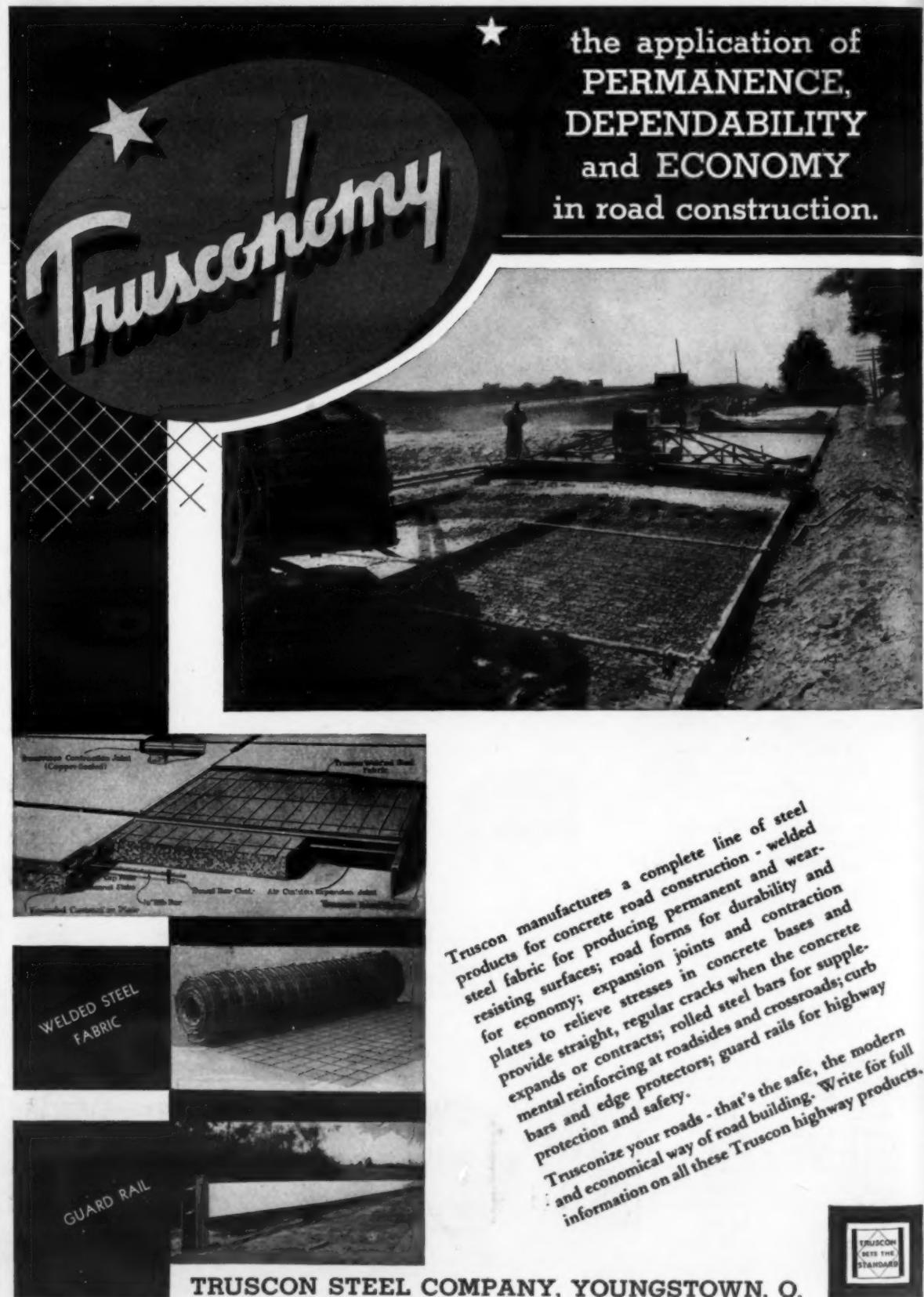
(Continued on page 22)

## Bucyrus-Erie Appoints New Distributor

The appointment of the Louisiana Tractor & Machinery Co., Inc., Baton Rouge, La., as Loadmaster distributor for the entire state of Louisiana has been announced by the Bucyrus-Erie Co., South Milwaukee, Wis. The quarters of this new distributor are located at 14th and North Boulevard Streets.



**the application of  
PERMANENCE,  
DEPENDABILITY  
and ECONOMY  
in road construction**



Truscon manufactures a complete line of steel products for concrete road construction - welded steel fabric for producing permanent and wear-resisting surfaces; road forms for durability and economy; expansion joints for contraction and plates to relieve stresses in concrete bases and provide straight, regular cracks when the concrete expands or contracts; rolled steel bars for supplemental reinforcing at roadsides and crossroads; curb bars and edge protectors; guard rails for highway protection and safety.

Use Truscon highway products. That's the safe, modern way of road building. Write for full information.

Truscon highway products. Write for full information on all these Truscon highway products.

# AIR COMPRESSOR from FORD PARTS

With the patented Smith Compressor Head you can now build your own Motor-Compressor with 60-cubic foot capacity. Head is furnished with high-speed compressor valves over two cylinders, unloader and complete instructions for mounting on your Model A or B Ford Motor. The Motor-Compressor is also now being made in over twenty states for drilling rock, breaking pavement, riveting, sand blasting, painting, etc.

**Write for full information and prices.**

**TRUSCON STEEL COMPANY, YOUNGSTOWN, O.**



the Louisiana  
Inc., Baton  
er distributor  
iana has been  
rus-Erie Co.  
The quarter  
re located at  
d Streets.



an ordinary V-shaped clamp of any  
adjustable. Pow-  
erful grip stays  
at any point  
tightening. Take  
many jobs. Hum-  
keep them com-

Circular  
CO.  
CHICAGO

f  
,  
Y  
n.



**IN DEEP MUD - BROKEN GROUND - CRUSHED ROCK**

**THIS NEW**

## **GROUND GRIP TIRE**

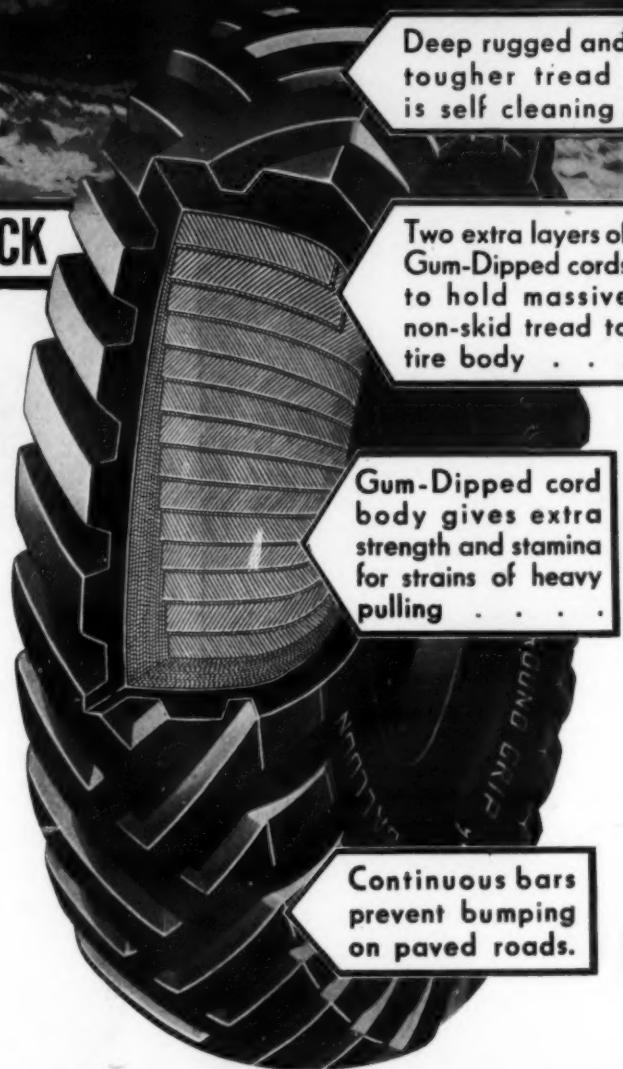
**WILL PULL YOUR EQUIPMENT THROUGH**

THE new Firestone Ground Grip Tire, built with a deep, thick, rugged tread, with widely spaced, self-cleaning bars of a new and tougher tread rubber, provides super-traction to move heavy loads. That's why this new tire makes its own road!

This big rugged tread, containing 54% more rubber, is held securely to the Gum-Dipped Cord body, because between the tread and the body there are two extra layers of Gum-Dipped High Stretch Cords, making a single unit of great strength. This is a patented Firestone construction feature.

The new line of Firestone Ground Grip Tires includes sizes and types for your trucks, cars, and tractors. See your nearest Firestone Service Store or Firestone Tire Dealer today. Let him tell you how these exclusive Firestone construction features enable you to make more trips—do more work and give you more dependable and economical service.

★★★★★ Listen to the Voice of Firestone—featuring Richard Crooks, Gladys Swarthout, Nelson Eddy, or Margaret Speaks—every Monday night over N. B. C.—WEAF Network . . . A Five Star Program



### **AUTO SUPPLIES AT A BIG SAVING**



**TRUCK  
TYPE  
BATTERIES**



**SPARK  
PLUGS**



**BRAKE  
LINING**

# **Firestone**

## Welding Speeds Work on Bridge at San Francisco

San Francisco's dream of a bridge spanning the water barrier between it and communities on the east side of the bay is rapidly becoming a reality as construction proceeds on the \$77,000,-

000 San Francisco-Oakland Bay Bridge. This bridge, which is over 8½ miles long including approaches, contains one of the longest cantilever spans in the world. This single span over the ship channel is 1,400 feet in length and suspended for 576 feet of its length. Only the Quebec Bridge and that over the Firth of Forth are longer.

Two modern engineering developments are speeding construction of this bridge. One of these is a specially constructed caisson of the compressed air

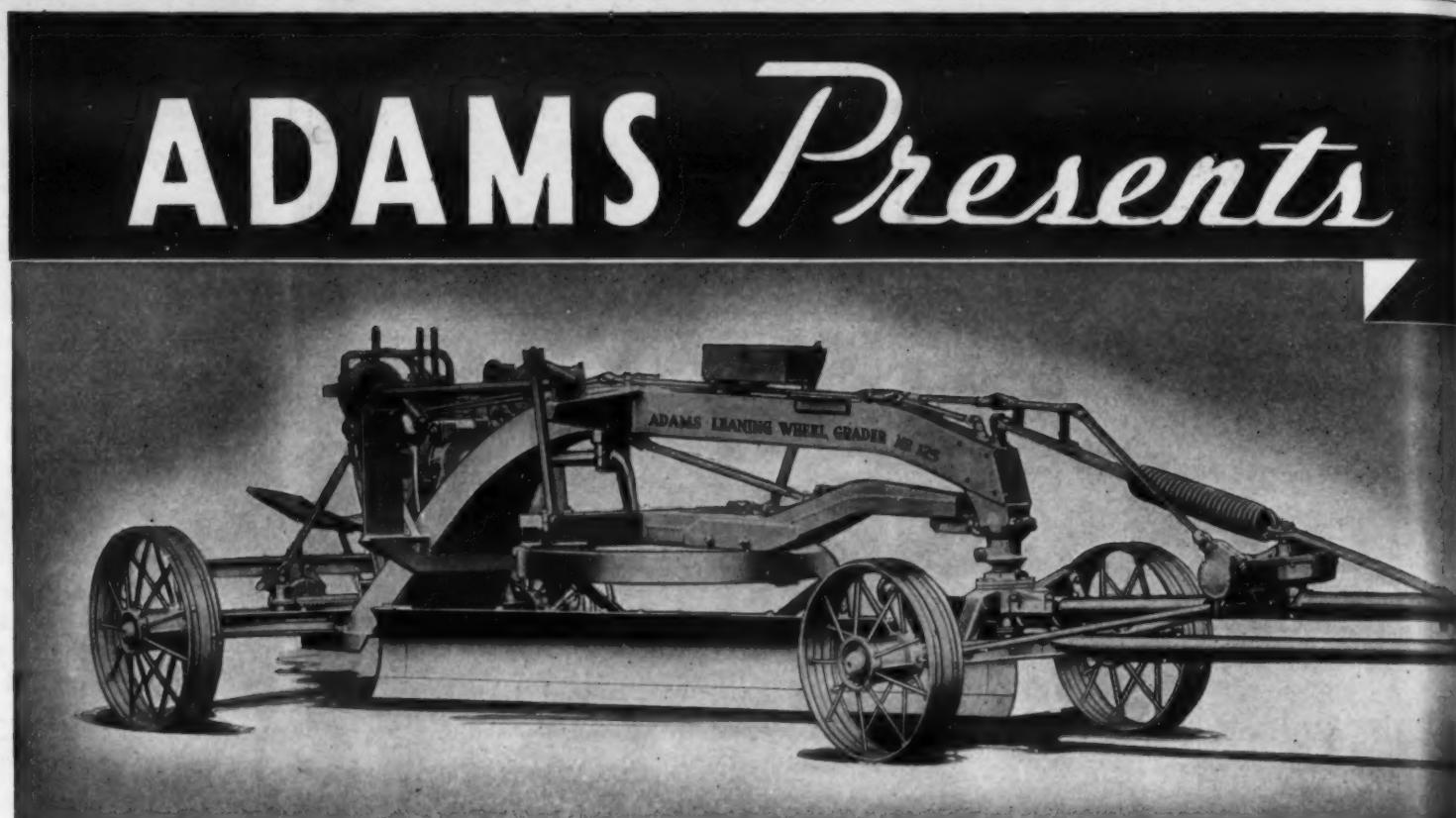
flootation type for anchoring the piers; the other is a giant wire-spinning wheel for spinning the cable.

### Wire-Spinning Wheels

The wire-spinning wheels, over one hundred of which have been built for spinning cable for this bridge, are entirely of arc-welded steel construction. Built by R. B. Hayward Co., of Chicago, these wheels are 94 inches in diameter, 4 inches thick and weigh approximately 5,000 pounds completely assembled. They are built of 8 and 10-gage steel

welded by the shielded arc process with Lincoln welding equipment and electrodes. Each wheel will carry 16 tons of 3/16-inch steel wire.

Six of these spinning wheel units, consisting of two wheels and drum, are used on one huge cable spinning machine which can turn out over 80 tons of wire rope in a single length without reloading. A single 8½-mile length of 1½-inch wire rope, such as could be produced by this machine at one loading, would contain over 2,500 miles of steel wire.



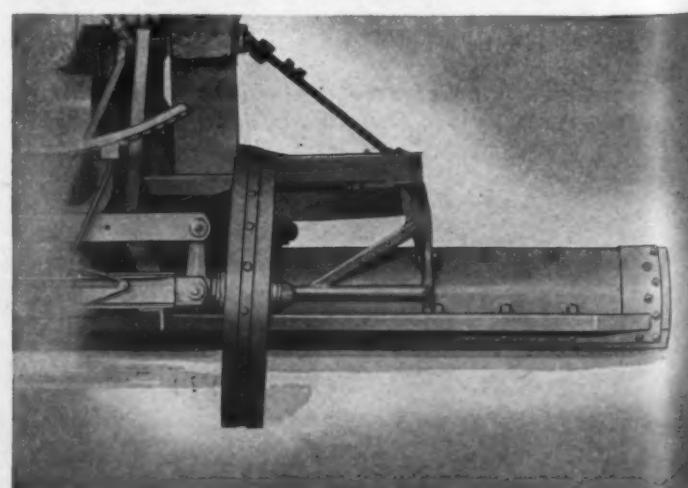
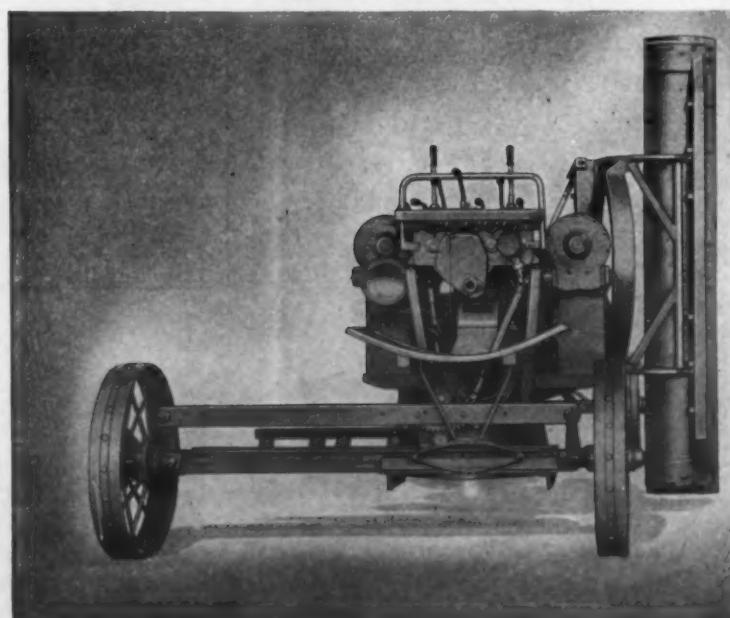
Fifty years ago J. D. Adams invented the adjustable leaning wheel grader and marketed his first model. That invention, and numerous later ones, have long since established Adams Leaning Wheel Graders in a position of leadership.

Now Adams presents four new graders that set a new high mark in mechanical excellence and operating advantages. A year of severe field

tests have conclusively proved their practicability and durability. Their extreme simplicity will impress you—their great strength and rigidity will amaze you—and the things you can do with the blade positively will astound you. Not only can you get new, extreme blade positions for every kind of cut but you get them quickly and with little or no mechanical adjustment.

Never before have so many good features been built into one machine—never before have you been offered such grader value. Here, in fact, is "The Kind of Grader You've Always Wanted."

*Illustration at left shows extreme blade adjustment possible with new Adams design; this position can be obtained without any readjustment of lift links—a decided advantage as every operator knows... Blade can be extended far outside the line of wheels for shoulder cuts—6 feet with 10 foot blade, and 7½ feet with 12 foot blade. Extensions increase reaches to 9 feet and 10½ feet respectively.*



## Picks and Shovels

(Continued from page 1)

the bridge before and after school hours to keep the children moving and the usual afternoon audience was always there. Failing to get results at the school, the worried engineer took up the matter with a number of parents. But parental lectures did not lessen the troubles at the bridge.

Two pedestrians, one man and a woman, were killed at the bridge, at

night, which increased the engineer's worries over the danger to the children.

It is unfortunate that the school authorities failed to realize their responsibility in the matter and neglected the opportunity of driving home an excellent safety lesson.

### Posters Would Help

However, it would have saved the engineer and contractor a good many headaches and near cases of heart failure, and might have averted the tragedy

of a fatal accident, had the contractor invested in a few of the striking and effective Safety posters, which are available from the National Safety Council at a nominal cost, and posted them on the structure and along the children's route. They might also have jolted the school authorities into much-needed action by presenting the school with a few of these posters, which carry home the message of safety in a far more effective manner than daily "lectures" by harassed school teachers and irate parents.

## Hercules Branch Moved

The Hercules Motors Corp. of Canton, Ohio has announced the removal of its West Coast Office from 613 Russ Bldg., San Francisco to Room 523 Transamerica Building, 7th & Olive Sts., Los Angeles, Calif.

Oliver S. Kelly, direct factory representative on the West Coast, is now located at the latter address, from which point he contacts manufacturers and dealers in the western part of the United States.

# 4 New GRADERS

### YOU WILL WANT THESE NEW FEATURES:

**New Box-Type Frame**—made of heavy ship channels and steel plates, electric-welded full length. Has great strength and rigidity to hold blade firmly to the cut—100% stronger against twist than previous Adams frames and that's plenty strong.

**Wide Range of Blade Positions**—with no changes in lift link positions or shift of moldboard on 90% of your work. A big operating advantage—ask any operator.

**Quick Adjustments**—with power-operated controls blade can be raised from plowing position to perpendicular (as shown on opposite page) in 40 seconds. Frame can be shifted on rear axle (for one way work) in 45 seconds. Can you do this with your grader?

**Extraordinary Visibility**—due to narrow frame and simple, clean-cut design throughout, operator can always see full length of blade and observe work being done. Increases operator's efficiency.

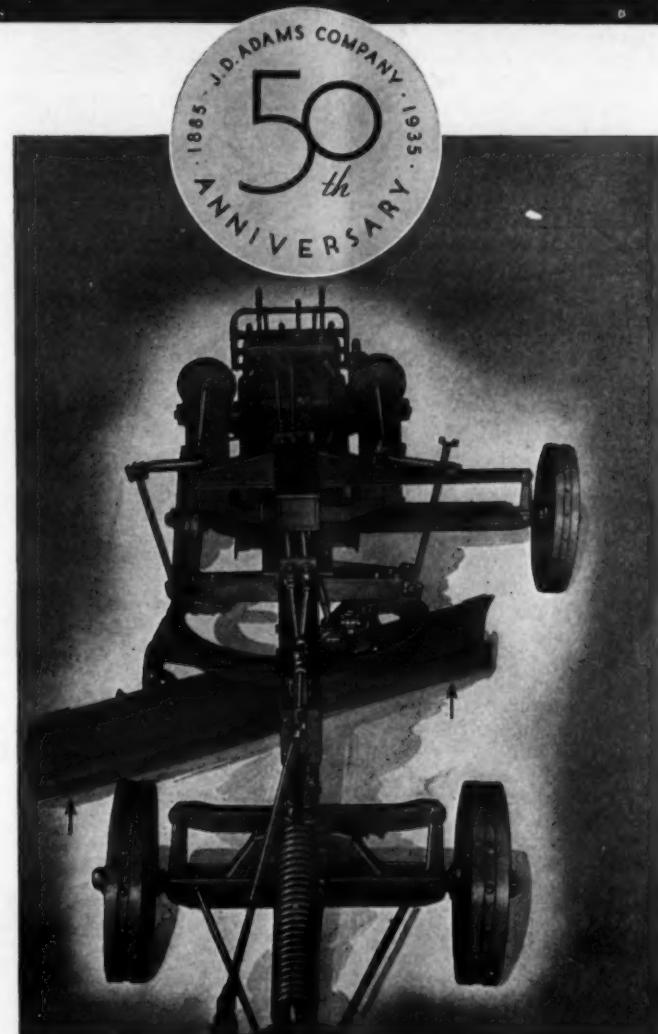
**Many Mechanical Features**—including exclusive anti-coasting devices on operating adjustments which work automatically and lock adjustments in position until changed by operator . . . Renewable ball and socket connection between frame and front axle . . . Deep curved moldboard for rolling dirt with least friction . . . Low draft connection to frame provides enormous cutting capacity . . . New "T" type drawbar—strong, simple and improves visibility . . . Positive-acting, trouble-free steerable tongue . . . Rigid, all-welded construction throughout which guarantees long life.

Don't buy any grader until you investigate these new machines. Available in 12 foot and 10 foot sizes and with hand or power-operated controls. Ask your local Adams representative for descriptive matter or write directly to

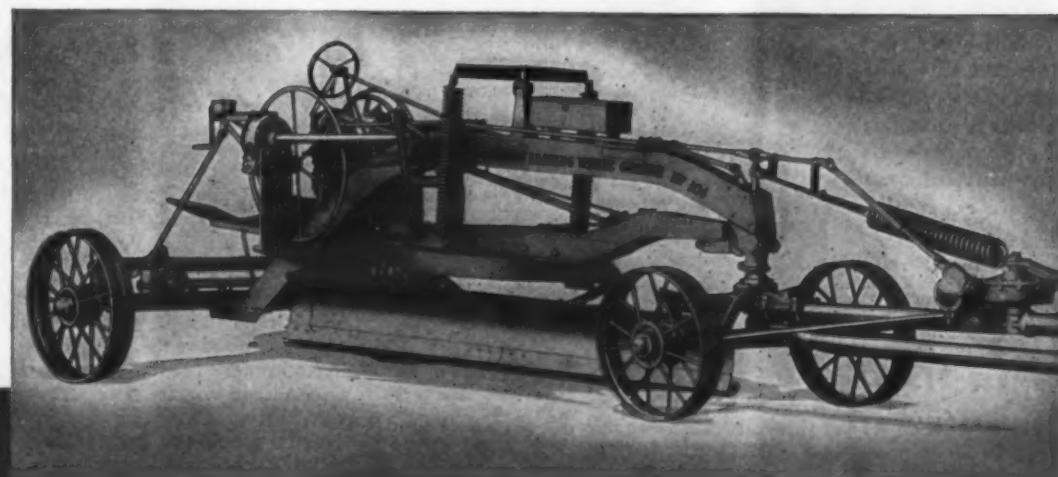
**J. D. ADAMS COMPANY**  
INDIANAPOLIS, INDIANA

Branches, Representatives and Distributors throughout United States

Illustrated on opposite page is Grader No. 125 with 12 foot blade and power-operated controls; 10 foot model known as No. 105. Adams power-operated controls afford quick, positive and accurate adjustments with saving of time, energy and money . . . Grader No. 104 (shown at right) has 10 foot blade and hand-operated controls; 12 foot blade model known as No. 124. Hand-operated machines have equalizing lift springs to make blade manipulation easy.



Adams new box-type frame is built of heavy ship channels and steel plates welded their entire length.



# The Dredge Manatee With Diesel Power Delivers the Goods

(Photo on page 44)

**T**HE dredge Manatee was designed by R. C. Pierce, Assoc. Mem., Am. Soc. C. E., Vice President and Treasurer of Wilbanks & Pierce, Inc., of New Orleans, La., whose 2,200,000-cubic yard highway fill contract was described in our May issue.

The dredge was built at Slidell, La., by the Canouette Shipbuilding Co. The machinery was set by the contractor's organization.

The dredge hull has an overall length of 120 feet, is 7 feet 7 inches in depth and has a beam of 34 feet. The hull and house are built entirely of steel with the exception of the sections of the roof over the living quarters and the operating room, which are covered with wood sheathing and asbestos built-up roofing to make the rooms cooler. The hull has two longitudinal bulkheads and five cross bulkheads. The former were designed to furnish the principal strength of the hull. The supports for the spuds at the stern, and for the digging ladder at the bow, are carried directly on these longitudinal bulkheads. The loads from all the principal pieces of machinery are carried directly to these bulkheads through cross girders of 28-inch depth spaced at 6-foot intervals under the engine and pump pits. Two 12-inch x 12-inch x 120-pound girder beams, with cross stiffening webs welded between the flanges at close intervals, rest on these cross girders and run the length of the engine and pump pits, carrying the main engine and dredge pump, the auxiliary engine and generator, and holding these units very effectively in alignment.

## Bulkheads

The five cross bulkheads and the two longitudinal bulkheads divide the hull into sixteen watertight compartments, in addition to the engine pit and the pump pit. Four of these compartments, located on either side of the dredge and about a quarter of the hull length from each end, are used for fuel oil storage. The location of the compartments permits their use in trimming the dredge.

## Efficient Dredging Unit Designed by R. C. Pierce of Wilbanks & Pierce, New Orleans, La.

The four compartments have a total capacity of 32,000 gallons, enough for a normal month's operation. With this amount of oil aboard, the dredge draws 6 feet, and with the oil storage compartments empty, she draws 5 feet.

### Digging Ladder and Hoist

The digging ladder is 50 feet long, the

main members being 30-inch x 10½-inch x 100-pound girder beams. The back end of the ladder pivots vertically on heavy trunnions set into the sides of the ladder well, which extends back between the extensions of the main longitudinal bulkheads for a depth of 12 feet from the bow of the dredge. The cutter is 70 inches in diameter and the cutter drive shaft is 7½ inches in diameter. The 200-hp cutter motor is a Westinghouse mill-type unit, force-ventilated, and will operate at full load through a speed range of 425 to 850 rpm. These speeds are reduced through gearing so that the cutter can be operated continuously at any speed between 14 and 28 rpm.

The hoist mounted forward directly beneath the operator's room and on the main deck is a Bucyrus-Erie 5-drum hoist with a 20,000-pound line pull and is driven by a 60-hp Westinghouse Type SK variable speed motor. This hoist picks up the two stern spuds, swings the dredge and raises the ladder. The swing anchors are run out 300 to 600 feet

on either side forward. The dredge is operated with a maximum 225-foot swing. For moving forward the dredge is pivoted alternately on the two stern spuds which are built up of structural steel and measure 24 inches x 25¾ inches and 60 feet long.

## The Pilot Clutch

A new development in connection with  
(Continued on page 18)



### 2" Self-Priming Centrifugal Pump

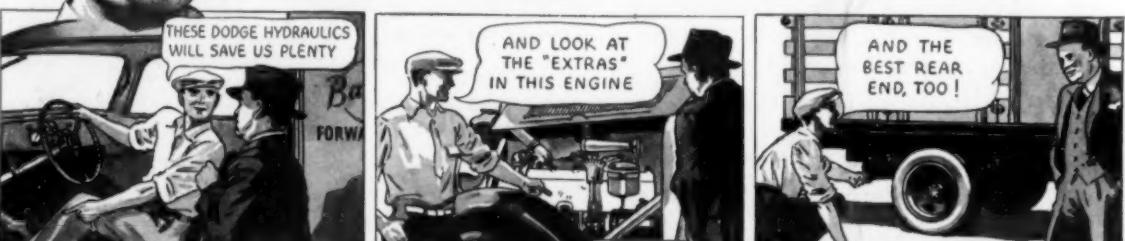
Easily carried by one man; 100% automatic. No handles or petcocks to be adjusted. Four-cycle engine with oil reservoir in crankcase. Easy to start—Speed control—Air cleaner. Foot and rope starters—self-oiling. Engine has only one place requiring lubrication.

Ask for Specification Sheet 20A  
Marlow Pumps, Ridgewood, N.J.



Dodge 1 1/4-Ton 16' Wheelbase Chassis and Cab with 12' Stake Body—\$730\*

**DRIVER MULROY SAYS, "I WOULDN'T DRIVE A TRUCK WITHOUT HYDRAULIC BRAKES."**



**HYDRAULIC BRAKES**—work better, safer... because they stay equalized. Save money on tires, brake lining and adjusting expense. Only Dodge, of the three lowest-priced trucks, gives them to you.

**6-CYLINDER, L-HEAD ENGINE**—Simple, compact, powerful! Gives you many such money-saving features as valve seat inserts, full-pressure lubrication, 4 main bearings, 4 piston rings, aluminum alloy pistons, etc.

**FULL-FLOATING REAR AXLE**—Dodge was first of the three lowest-priced trucks to give you a full-floating rear axle along with eight tapered roller bearings to save repairs, save trouble, cut upkeep expense for you.



**ROLLER-BEARING UNIVERSALS**—Another feature of quality truck building—dirt-proof, prevent backlash, save upkeep expense.



**VALVE SEAT INSERTS**—Another money-saving feature pioneered by Dodge in low-priced trucks. Save gas... cut valve grinding bills.

**COMPARE THESE AMAZING VALUES... AS LOW AS \$365\***

**T**RUCK drivers know what they're talking about when they say, "Dodge is the best-built truck in the lowest price field." If you're going to buy a truck, you owe it to yourself to get the facts.

Among the three lowest-priced trucks, Dodge actually is priced lower on some models... slightly higher on others... the difference in price either way is only a few dollars. But what a difference there is in construction—in features that make your truck last longer—fea-

tures that you can see must cut gas, oil and tire costs!

Before you buy any truck, see your Dodge dealer. Ask him for a "show-down" of Dodge high-priced features that are switching thousands to Dodge. See him today.

**DODGE DIVISION — CHRYSLER MOTORS**

\*List prices at factory, Detroit, subject to change without notice. Special equipment, including dual wheels on 1½-ton models, extra. Time payments to fit your budget. Ask about the official Chrysler Motors Commercial Credit Plan. (Dodge passenger cars \$645\* and up.)

**Dependable DODGE TRUCKS**



NEW ½ YARD, Model 350

For greater line pulls, larger capacities, faster speed, less weight, and low operating costs, we invite investigation and comparison

Send for new roto publication, "American Gopher Shovels" Illustrated, showing action pictures "on the job."



**AMERICAN HOIST & DERRICK CO.**  
ST. PAUL, MINN.



The Eagle Sand De-Waterer

### Producing Clean Aggregate With Spiral Screw Washers

The basis of good concrete is clean aggregate. No matter how well a mix may be designed, unless the aggregate is clean good results cannot be secured. One of the leading methods of washing aggregate is with the spiral screw washer of the type made by the Eagle Iron Works, Des Moines, Iowa.

Both the Eagle gravel and sand washers operate on the same principle, removing foreign material from the aggregate by means of an upward current of water from the bottom inlets throughout the entire bed of material as it is conveyed up to the material discharge end, thus taking advantage of the difference in the specific gravities of foreign material and the aggregate. At the same time the material is subjected to an abrading action both by the screw and the bent bar agitators, the pieces rubbing one against the other, giving the aggregate a severe scrubbing. Concurrently the rising current carries the loosened foreign material to the top where it is carried back to the lower water discharge end. When the aggregate reaches the upper end of the inclined tub, the dewatering of the material is complete.

The manner of introducing wash water through the bottom inlets is exclusive in Eagle washers. Instead of a few large openings at the lower end there is a multiplicity of smaller holes extending the length of the tub, decreasing in size toward the upper end. This gives the required upward current for efficient removal of foreign material for the full length of the tub.

The amount of wash water depends upon the nature and amount of foreign material. Different conditions require diverse handling, such as more or less water, different speed of screw, higher discharge end plates or possibly elevation adjustment or difference in number of agitators. These points can not always be settled in advance but are determined readily in actual test.

### New 1/2-Yard Excavator Extends Line

With the announcement of a new American Gopher 1/2-yard excavator, the American Hoist & Derrick Co., St. Paul, Minn., builders of shovels for 30 years, extends the range of sizes of the American Gopher to cover the field from 1/2-yard to 2-yard capacity.

This new Model 350, which is a crawler-type shovel-crane-dragline, with gasoline, diesel or electric power, has a number of new features, including spined shafts, anti-friction bearings, independent chain crowd, high operating speeds, and quick convertibility.

Complete details of this new shovel are contained in a new catalog which can be secured free from the company.

**TENTS  
TARPAULINS  
WINDBREAKS**

The Fulton line is sold through Contractor Supply Dealers in every state. A quality line priced right. Ask for BHUREDY and FULTEX Tarpaulins. Tents. Windbreaks. Write our nearest plant today for catalog, samples and price list.

Fulton Bag & Cotton Mills  
Atlanta - Boston - Buffalo - Cincinnati - Chicago - Detroit - El Paso - Houston - Kansas City - Minneapolis - Brooklyn - New Orleans - St. Louis - Dallas

### Tractor Turned Submarine In Nicaragua Logging Camp

From Prinzapolka, Nicaragua, comes the story of a Caterpillar diesel Thirty-Five that played submarine as a result of the efforts of the natives to wash the bright yellow paint which had become rather mud-splattered after several weeks of wallowing in tropical ooze. The tractor was run to the log dump, a steep incline on the banks of the Prinzapolka River, where the brake was set and the bath was begun. While the Superintendent's back was turned and the natives were intent on their scrubbing operations, some Indian children climbed into the driver's seat and released the brake, with the inevitable result that tractor and children headed pell-mell for the river.

Fortunately the children jumped to safety before the machine had gained much headway, but the luckless tractor went plunging to what appeared to be a watery grave. After several days of

diving, the natives finally located the tractor in some 30 feet of water at the very center of the channel. Several unsuccessful attempts were made to salvage it, but finally heavy chains were placed around the tracks and, with the aid of blocks, rope, trucks and man power, the big machine was finally dragged onto the bank.

In spite of the fact that the tractor had been submerged for three weeks,

Paul Weaver, the tractor superintendent, felt sure that all the machine needed was a good cleaning up. He proceeded to do this with the help of his native crew. The success of the job is vouched for in the company's report, "The tractor was started back to work with no trouble whatsoever. The only apparent damage was to the paint on the hood and the machine has gone on giving no trouble of any kind."



#### SPREAD STONE EVENLY—RAPIDLY

to any specified depth up to 18 in. Write for complete description and cost of a Burch Stone Spreader to fit your job.

THE BURCH CORP.,  
Crestline, Ohio.

for BETTER ROADS  
at LOWER COST

## MORE AIR...AT LOWER COST...

### AERO 2 STAGE WORTHINGTON PORTABLE COMPRESSORS

#### 5 SIZES:

60 . . . 105 . . . 160

210 . . . 315

Cubic Feet

ACTUAL AIR  
DELIVERED



Available in every  
type of mounting...

TOWABOUT, TRAILER, TRUCK, SKID, POWER TAKE-OFF, RAIL CAR, MINE CAR

- Feather valves
- Oil bath air cleaners
- Force-feed lubrication
- 30% reserve horsepower
- 6-cylinder Hercules engine
- Improved all-steel welded chassis

#### Send for Bulletin

Greatest amount of air . . .

for lowest fuel and maintenance cost

Air-cooled compressor lowers upkeep cost

Balanced angle design . . . no vibration

200° lower temperatures . . . no carbon deposits . . . increased valve efficiency

#### WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: HARRISON, NEW JERSEY - District Offices (for Sales and Service) in Principal Cities

# WORTHINGTON



ATLANTA BOSTON BUFFALO CINCINNATI DALLAS DETROIT EL PASO HOUSTON KANSAS CITY

CHICAGO CLEVELAND DALLAS DENVER

DETROIT EL PASO HOUSTON KANSAS CITY

LOS ANGELES NEW ORLEANS PITTSBURGH SEATTLE  
NEW YORK ST. LOUIS ST. PAUL TULSA  
PHILADELPHIA SAN FRANCISCO WASHINGTON





Riverside Drive, Memphis, Protected with Duraguard

### Scenic Drive in Memphis Has Many Safety Features

The new scenic Riverside Drive in Memphis, Tenn., which will carry through traffic from the southwest and from the Harahan Bridge around the business district, was designed and constructed with the best possible facilities for insuring safe travel for the heavy traffic which this road will carry.

Wherever chance of sliding seemed probable, the steep slopes of the fills have been paved with suitable material; other slopes have been sodded. A water-bound macadam paving has been installed to prevent skidding; a lighting system, erected on concrete pedestals, has been installed to provide proper lighting for night travel.

In order to prevent reckless drivers from precipitating themselves into the river, the City Engineering Department of Memphis installed Truscon Duraguard rail. This rail has been erected on concrete posts 16 feet on centers. The posts are well reinforced with steel and set deep enough to absorb the most severe shock.

When a car strikes Duraguard, the guard plates yield slightly, then the reflex action throws the front end of the machine back, at the same time straightening the wheels so that the course of the machine is parallel to the guard. The vehicle then slides along without striking the posts or becoming entangled.

Visibility is high, for the concrete posts with a continuous band of aluminum painted steel, 12 inches wide, stand out clearly against any background, in broad daylight or dark night.

### Moving Dirt 4,200 Feet in 18.1 Minutes

Some interesting figures on dirt moving speeds on the Brooks-Calloway Co. levee job near Marion, Ark., are recorded in a recent issue of *Le Tourneau News*.

The borrow pit is situated on the river side of the levee, the fill on the land side. Holes are cut through the levee at intervals to flatten the grade for the tractors, leaving however a 12 per cent ramp of 150 feet on the river side and a 15 per cent down grade to the land fill. The round trip is 4,200 feet.

Over a 7-hour period, a Le Tourneau 25-yard buggy pulled by a Caterpillar diesel Seventy-Five and carrying capacity loads of 25 cubic yards, averaged a round trip every 18.1 minutes, the time being divided as follows: 4.2 minutes to load with a 1 1/4-yard shovel, 7.7 minutes to haul, 6.1 minutes to make the return trip. The haul is made over a wet, sticky clay-filled soil with little bearing surface. The total yardage on this section is 6,000,000 cubic yards.

### Wood Structural Design Data

"Wood Structural Design Data" by R. G. Kimball, A. T. Upson, and M. Ahern, is replete with information and tables dealing with the structural design and use of lumber. It collates for the designer much information not obtainable in any one source, a portion of which is not available anywhere. This first volume treats in logical continuity the first fundamentals with which the architect, the engineer and designer

must be acquainted to use wood structurally in a safe, economical manner.

The book contains discussions of the physical, chemical and mechanical properties of wood, a glossary and abbreviations of lumber terms, lumber quantity costs, sizes of standard yard

lumber and timber, wood beams, columns, plank and laminated floors, and references.

Copies of this 294-page book are available from the National Lumber Manufacturers Assn., 1337 Connecticut Ave., Washington, D. C.; price, \$1.00.

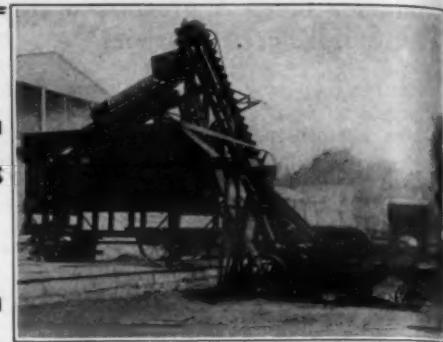


#### "GOOD ROADS" CHAMPION COMPLETELY PORTABLE ROCK CRUSHING and SCREENING PLANTS

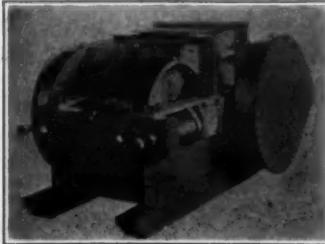
"Efficient in production—low maintenance cost."

The "Two in One"  
"GOOD ROADS" ROLLER-BEARING CRUSHER  
REDUCING TO FINES IN ONE OPERATION  
Complete plant machinery for Quarries  
Sand and Gravel Pits

**GOOD ROADS MACHINERY CORPORATION**  
KENNETT SQUARE PENNSYLVANIA



Pictured here are six new and important additions to the Cedar Rapids line. Equipment to meet every crushing, screening, or material handling requirement. Write for descriptive circulars on any equipment in which you may be interested.



40 in. by 20 in. Cedar Rapids roll crusher.  
Made in two other popular sizes—  
30 in. by 18 in. and 16 in. by 16 in.

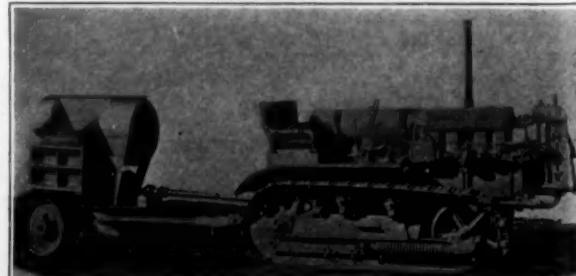
More  
Complete  
Than Ever  
Before



Symons-Cedar Rapids vibrator screen for Cedar Rapids portable plants.



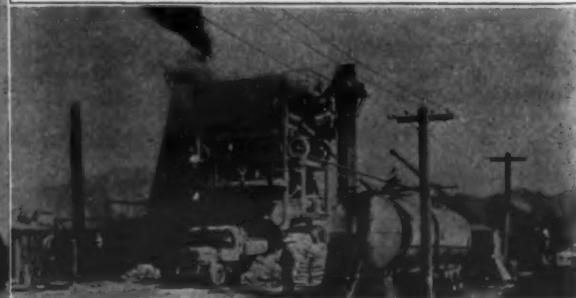
Tandem Straight Line portable plant with vibrator screen. Available in all sizes—with jaw or roll crushers for secondary reduction.  
Gasoline or Diesel power.



Tractor-trailor conveyor unit for roadside operation. Many other sizes and styles available.



The Cedar Rapids one piece outfit equipped with the new Symons vibrator screen—for greater capacity and efficiency. Ask us about the "Symons Changeover Plan" for present plants with rotary screens.



Standard-Cedar Rapids asphalt paving plant. Made in sizes with 300 to 3000 pound twin pugmills. Batch type plants with dryers, electric timing and locking devices—meets the most rigid state specifications.

**IOWA MANUFACTURING COMPANY**  
**CEDAR RAPIDS, IOWA**

### WONT QUIT or cause time out



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company  
32-36 Dey Street  
New York, N.Y.

**Hayward Buckets**

## Stable Clay Fill for Bridge Approach

(Continued from page 1)

beam, maintained a 60-second loading cycle. The pit was normally dry but late in July the dry spell was broken by a series of thunder storms, necessitating the installation of a Fairbanks-Morse diaphragm pump to keep the truck runway in the pit dry.

### Placing the Embankment Fill

The average haul from the pit to the embankment was 3,500 feet with a maximum of 6,300 feet. The new section that was cleared and grubbed prior to placing the embankment was slightly swampy but entirely free of muck. There was about 3 feet of loamy clay overlying the red clay of the district. The embankment section had a crown 34 feet wide with 2 to 1 slopes.

The trucks ran over the fill dumping as indicated by the foreman and the material was then spread in 12-inch lifts by a Caterpillar Sixty with a LaPlant-Choate 10-foot bulldozer. The constant trucking over the new fill, the pressure of the tractor treads, and the rolling with a 10-ton Buffalo-Springfield gas roller kept the top of the fill so hard that it shed water quickly and was ready for work far ahead of the pit. In 12 hours after the hardest rains trucks could be operated readily on top of the fill without danger of sliding off.

During the early part of the operation the pit was very dusty so the contractor placed a Fairbanks-Morse plunger pump at the edge of the river close to the fill and pumped 2,500 gph through 1,500 feet of 2-inch water line to 200 feet of  $\frac{3}{4}$ -inch sprinkler hose on the fill. All material was wet down as soon as spread. This accounts for the ready compaction of the material as the trucks and other units drove over it. As the bulldozer passed over the material most frequently it was felt that it more than any other piece of equipment was responsible for the solidity of the fill. Next in importance was the constant wetting down of the material which was more effective than jetting would have been on a similar fill made direct with dragline and not compacted as built up.

In 21 working days in June the contractor produced 18,000 cubic yards of fill, borrow pit measurement, with this outfit.

### Lighting the Job

As work was continued 20 hours a day, lighting was necessary for night work. The contractor mounted a Kohler and a Delco 1,500-watt lighting outfit on skids and hauled them with any piece of equipment handy to the location where they were needed. With each plant was a 20-foot pole, suitable wiring and a 1,500-watt General Electric floodlight unit mounted at the end of the



C. & E. M. Photo  
The Kohler Lighting Plant, and Floodlight on 20-Foot Pole

pole. Two men, with whatever hauled the unit, could handle it readily. The men used a post hole digger and set the pole into the material at the edge of the fill and turned it so as to light the area being worked.

### Approach Trestle Repairs

The repair of the approach trestles required the removal of the decking and caps of 51 panels. The caps were 10 x 12's 20 feet long and the decking was 20-foot lengths of 3 x 8-inch southern pine treated with a penetration of 12 pounds of creosote. All new material for the repairs was brought in on a spur track about 3 miles from the bridge on the north side and trucked to the site. All work was done from the north side working toward the fill at the south. Thus the first work to be completed was the repair of the approaches, and second the embankment on the south approach with its paving, so that the materials for the relief trestle could be

hauled over the bridge and the south approach embankment. The timbers were handled by a small A-frame derrick operated by hand.

### The Relief Opening Trestle

The relief opening is 800 feet long, allowing a flow area of about 6,000 square feet, and takes the place of cul-

(Continued on page 35)

### UNIVERSAL ARC WELDER

Accepted for every welding job  
Easy, economical operation and  
the production of perfect welds  
are the qualities that have won  
new friends everywhere.

Let us tell you about it.



UNIVERSAL  
ARC WELDERS  
Universal Power  
Corporation  
Clarkstone Road  
CLEVELAND,  
OHIO

## GET THE SHOW-DOWN ON ROAD MAINTENANCE

THE records of thousands of miles of road-work bear witness to the money-saving possibilities of "Caterpillar" Diesel Power. The same rugged engine that drives "Caterpillar" Diesel Tractors is used in "Caterpillar" Diesel Auto Patrols . . . and, in power units, operates gravel plants, air compressors, generators, other equipment. Get a SHOW-DOWN on how it can cut your power costs. Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

Near Port Royal, Pa., this "Caterpillar" Diesel Auto Patrol is making road maintenance funds do more work than ever before. Its fuel cost alone is \$2 to \$3 less per 5-hour day than that of a gasoline-powered maintainer.

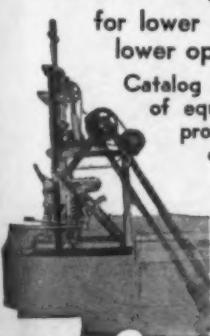
**CATERPILLAR**  
REG. U. S. PAT. OFF.  
DIESEL STEEL

## MILES Concrete Equipment

for lower first cost and  
lower operating cost

Catalog of complete line  
of equipment for the  
production of concrete  
units will be  
sent on request.

•  
THE MILES  
MFG. CO.  
Jackson, Mich.



## It's Also a Real Job to Maintain Roads

### Care of Stabilized Roads Presents Special Problems Dependent on Weather

THAT the construction of stabilized roads is a real job was brought out in the article of that title by H. G. Sours, County Engineer of Summit County, Ohio, which appeared in the May issue of CONTRACTORS AND ENGINEERS MONTHLY. But the job does not end when the road is built. Mr. Sours gives us his suggestions for the maintenance of this type of road in order to keep them in first-class condition.

#### Wet Weather Maintenance

One of the most important questions in connection with stabilized road work is to know what to do with them after they have been built. No loose or floating material should be carried on the surface during dry weather. This acts as an abrasive material and tends under traffic to create raveling. Blading should be done only after rains sufficient to make the surface workable. Any attempt to blade while dry tends to loosen the top material; it also wastes the calcium chloride which has been drawn to the surface by capillarity during dry weather.

If wet weather is encountered soon after completion of the work there may be a tendency toward either a slippery or sticky surface. This is caused by the fact that there may be some clay on the surface which has not thoroughly compacted. Under ordinary weather conditions some of this will wear off and leave a hard surface. If it becomes slippery at first, it may be necessary to put on a light application of some kind of gritty cover material.

During wet weather a small amount of loose aggregate may be bladed in and spread over the surface; this material will bind in and help to fill any small depressions. A small amount of the shoulder soil, if of a satisfactory quality, will help to bind the loose material when bladed over the surface. If the shoulder soil is not satisfactory as a binder a small quantity of clay may be spread along the shoulder and held available for use at the proper time. When the surface again becomes dry the excess loose material should be removed by blading off lightly onto the shoulders. A combination of the cutting and building up methods may often be used to advantage.

#### Dry Weather Maintenance

There may be times during a continued dry period when it will be found necessary to patch some holes in the surface. Patching of a series of very slight depressions is not considered advisable but the deeper holes should be filled. A mixture of approximately 50 per cent graded gravel under  $\frac{1}{2}$ -inch in size and 50 per cent sand clay together with from 100 to 150 pounds of calcium chloride per cubic yard will make a good patching material.

#### Chloride Maintenance

Moisture retention of a stabilized road mix is necessary to retain stability and prevent raveling. This is accomplished by periodic applications of calcium chloride. About 2 pounds per square yard per year are required. The best results are obtained by applying 1 pound per square yard in the spring when the road metal is still moist. This can be followed by one or two applications of  $\frac{1}{2}$  pound per square yard each; conditions will govern the need of re-treatments. In general, less calcium chloride is needed after the first two years.

#### Supercharged Diesel Truck for South American Mountains

A six-cylinder six-wheel 125-hp diesel truck, of 20-ton capacity, especially designed for use in high altitudes, was recently shipped by the Sterling Motor Truck Co. to South America where it

will be put into service by the Cia Minera Aquilar, an associate of St. Joseph Lead Co., at its mines at a height of 13,000 to 14,000 feet.

The standard motor truck loses as much as 3 per cent efficiency at an altitude of 1,000 feet and at 14,000 feet the loss is often great enough to cause a severe handicap in operations where heavy loads have to be carried over steep grades.

This Sterling diesel truck has several refinements especially designed for this type of service, among which is a supercharger by means of which air is drawn through an air filter in such quantity as to equalize for the rarity of air at high altitudes. Another feature is the combination of three Krohn differentials into a single jackshaft driving unit. Power is equally divided between the four rear wheels by means of a large differential in the center which distributes the power to two differentials, one on each side. This is also designed to eliminate wheel spinning.

#### Speeding Road Work at High Altitudes

Many miles of Colorado's scenic highways are through the mountains, offering vistas of great beauty to the visitor but presenting special and difficult problems to the State Highway Department.

Among the equipment used in this work are several McCormick-Deering TD-40 diesel TracTracTors. At the higher altitudes prevailing in the mountains, there is less oxygen per cubic foot of air than at lower altitudes. This of course affects combustion and tends to decrease power output of any internal-combustion unit. It has been found however that the loss of power of diesel engines at high altitudes is considerably less than that of gasoline engines.

In the summer these TracTracTors are used for construction and maintenance and in the winter they help to keep the mountain roads clear of snow.

# KOEHRING

## HEAVY 27-E autocycle PAVER

For 1935 you will need a paver having high speed production combined with low maintenance cost. You cannot afford to operate inefficient and obsolete equipment.

The Koehring 27-E Autocycle Paver is fast, efficient and dependable.

Opportunity for profit will depend upon the ability to complete your job at *lower than average cost*. The most efficient and dependable equipment is a vital factor in securing this *lower than average cost*.

Investigate the Koehring 27-E Paver.



**KOEHRING COMPANY**  
MILWAUKEE WISCONSIN

**THE FAMOUS  
GIANTGRIP<sup>T</sup>  
STRAIGHTEDGE**

Either Steel or Aluminum  
Formed straight under tremendous pressure  
on tubemill presses, it STAYS straight.  
Two usable edges—one sharp-cornered and  
squared for scraping; the other rounded for  
line-point straighteding.  
Write for circular

**L & M  
Manufacturing Company**  
Largest Exclusive Manufacturers of Fixing Hand Tools  
18342 BEECHWOOD ROAD, CLEVELAND, OHIO

## Composite Pile Trestle Structure

(Continued from page 5)

capped with a 26-gage galvanized iron sheet on which the 24-foot timber cap 14 x 12 inches in section was placed.

### The Floating Pile Driver

The pile driving barge was 30 x 70 feet in area with a 5-foot depth and 34-inch draft, and carried the 85-foot structural steel tower which carried the pendulum leads of the same length. The leads, pivoted at the top, could be swung to give the required batter by inserting pins through the yoke at the foot of the leads. The piles were driven in a predetermined sequence. With the piles numbered from left to right they were driven as follows: 1, 5, 4, 3, and last 2. A Warrington-Vulcan No. 1 steam hammer weighing 9,600 pounds was used for driving. The steam equipment on the barge consisted of a 60-hp boiler and 3-drum Lidgerwood hoist and an auxiliary 40-hp boiler and 2-drum Lidgerwood for handling the barge. The anchors were placed 300 feet out on either side forward, a line was carried to a pile cluster forward and there was also a stern anchor. This pile driving outfit was built especially for this contract as the one with which the work was started had 60-foot leads so that the untreated portion of the composite pile was driven first. Then the treated portion was picked up, placed squarely on the butt of the untreated pile, the splice made in the leads and the composite pile then driven to its final position. Too much time was lost making the splice in the leads so the 85-foot lead pipe driver was built so that the composite pile would be driven as a unit. Two pile barges served the floating driver so that one could be loaded while the other was being unloaded.

The operating crew for the pile driver which worked two 6-hour shifts a day for five days a week consisted of: the foreman, a loftman, a leadsman, a winchman, the operator, a fireman, two pile driver hands, and two deck hands. This crew averaged twenty-five piles or five complete bents a day.

### Driving the Piles

A 1½-inch steel pile plate was fastened to the pile head by a ¾ x 9-inch spike through a hole in the center of the plate to prevent the ram from brooming the pile head during driving. As the strata penetrated were very uniform it was very much of a gamble just where to cut off the untreated piles to get the proper penetration of the splice, the proper bearing for the pile and yet not be penalized for over-driving. The contractor ordered the untreated piles about 4 feet longer than indicated by test piles driven at 500-foot intervals to be sure of having sufficient

(Continued on page 27)

## South Bend

**Bituminous Pressure  
Distributors  
Street Flushers  
Street Sprinklers**

Literature and prices on request

**MUNICIPAL SUPPLY  
COMPANY**  
SOUTH BEND, INDIANA

## Analysis of Bridges Without Higher Mathematics

Brief but clear and complete enough to enable designers of bridges to analyze rigid frame bridges quickly, the new edition of "Analysis of Rigid Frame Concrete Bridges" has many new features and information on the results of recent studies.

In addition to analysis by moment distribution, a new chart and a new formula are given as the basis of a procedure by which moments may be determined quickly without the use of frame analysis. This new procedure is valuable for use in making preliminary designs or in checking moments obtained by frame analysis.

A simple method of correcting moments in frames by allowing for deck curvature is presented, and important structural details used in rigid frame concrete bridges are added. There is also a new convenient method of determining stresses in double-reinforced

concrete sections subject to combined bending and axial thrust.

Copies of this 40-page booklet are available gratis by writing to the Port-

land Cement Association, 33 West Grand Avenue, Chicago, Ill., and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

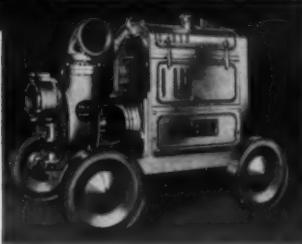
### JAEGER "SURE PRIME" PUMPS (10,000 to 135,000 GALLONS)



Left:  
"BANTAM  
WEIGH,"  
6500  
Gal.  
Portable  
Pump



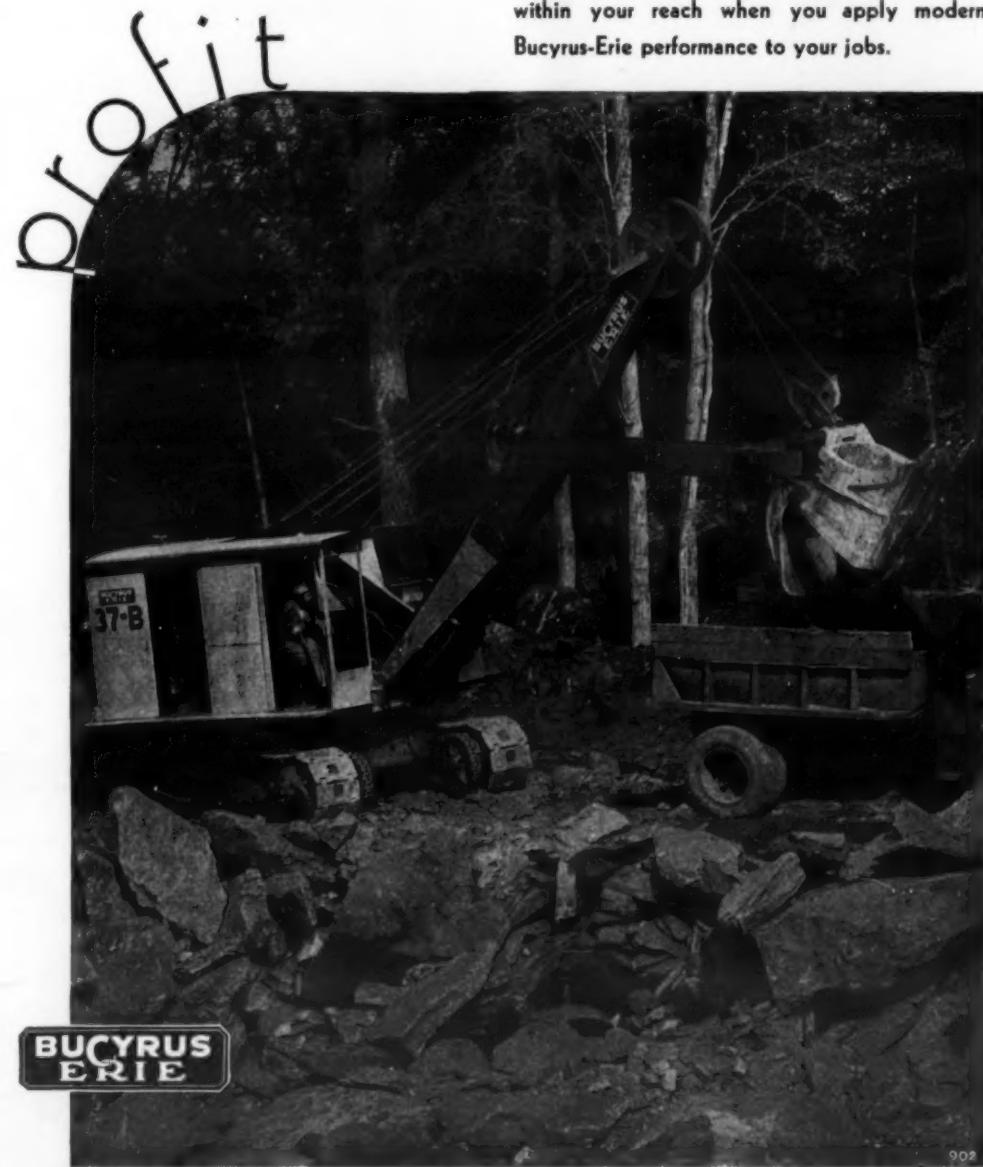
The "Handy Model"  
**LOWEST  
PRICED**  
8500 Gallon  
Pump Built



Built in 2", 3", 4", 6" and 8" sizes, Jaeger Heavy Duty Self-Priming Centrifugals are world's largest selling pumps of their type for construction jobs, industrial work, public utility and municipal maintenance, etc. JAEGER WELL POINT SYSTEMS provide "dry job" conditions at lowest known cost. Used on small jobs and biggest. Send for new CATALOG P-35.

THE JAEGER MACHINE CO.  
701 Dublin Ave., Columbus, Ohio

INSURE your profits with modern Bucyrus-Erie speed, power and control. Modern speed that increases output through fast digging, swinging, dumping, moving. Modern power that digs dirt fast and means sustained speed through the toughest going. Modern control that puts safely in the operator's hands full use of the speed and power built into these outstanding machines. Profits, impossible with obsolete machines, are within your reach when you apply modern Bucyrus-Erie performance to your jobs.



**BUCYRUS  
ERIE**

**BUCYRUS-ERIE**  
EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

## Dredge Manatee Delivers the Goods

(Continued from page 12)

The design of this dredge was the adaptation of the "pilot clutch", as used on some dragline machines, to the operation of the main friction drives on this hoist. With the use of this self-energizing arrangement, the friction levers are very easy to operate, and ample power for operating the friction drives is provided. The use of the pilot clutch makes unnecessary the use of air rams to operate the friction drives. There is a considerable saving in first cost and in maintenance. Moreover the pilot clutch enables the operator to "feel" the pull on the lines, and to set the frictions just tight enough to hold the load but not so tight but that an excessive load will cause them to slip, thus tending to prevent breaking lines and heavy shocks on the machinery.

### The Dredging Pump

Immediately aft of the hoist in the forward machinery well is a Bucyrus-Erie 18-inch dredging pump with a special horizontal stuffing box on the front side of the impeller to seal against any by-pass water. Timken roller bearings are used to take the radial and thrust loads. There is a Cutler-Hammer magnetic clutch between the main engine and the pump. A Westinghouse 175-kw generator at 220 volts direct current is mounted on the line shaft between the main engine and the pump. The main engine is a 1,000-hp Busch-Sulzer Type-E air-injection 8-cylinder 2-cycle diesel engine operating continuously. Placed immediately behind the main engine is a 300-hp Busch-Sulzer solid-injection 4-cylinder 4-cycle diesel engine direct-connected to a 200-kw 220-volt direct current Westinghouse generator which, under ordinary conditions, supplies all necessary power for driving the cutter motor, hoist, auxiliary pumps and other auxiliaries.

However, in case the digging is heavy and the cutter motor requires an excessive amount of power, part of the auxiliary load can be thrown onto the 175-kw generator driven by the 1,000-hp engine. All the larger motors are connected to double-throw switches on the switch board, and this enables the engineer to distribute the load between the two engines as desired. If the cutter load is not too heavy, the whole load can be thrown on the main engine, thus enabling the 300-hp engine to be shut down for repairs or adjustment. This procedure usually involves a restriction of the output of the dredge because it requires

that the main engine be slowed down or that a smaller diameter impeller be put into the pump in order to prevent overloading of the engine.

A vacuum of about 12 inches shows on the operator's gage when the suction line is carrying only a water load, but when working in heavy material it may run as high as 25 inches. An operator must learn all of the various combinations of readings of the pressure and vacuum gages as he can not see the area in which he is digging as it is all under water and invariably muddy, but the gages show if there is a choke in the suction or discharge line, if there is a break in the line, whether the cutter is fouled, and many other important features of operation.

### The Auxiliaries and Pumps

The main power plant is located in the machinery well but there is plenty of room on either side for the installation of all the accessory units required for the efficient operation of the dredge and still leave a companionway above the well on either side. Careful planning has produced a dredge with ample room for every man to move around in carrying out his duties and with the minimum opportunity for accident or injury from low beams or small auxiliary units mounted in the companionway.

A Caterpillar Fifty diesel power plant direct-connected to a 30-kw Westinghouse 220-volt direct current generator serves as a standby lighting plant when the main electric plant is not running. It supplies sufficient power to raise the ladder or spuds and to operate the electric welder and machine tools, and thus saves starting the larger unit solely for minor operations.

A 6-inch, 3-stage Hill centrifugal pump driven by a 50-hp variable-speed

(Continued on page 30)

### Concrete Bridge Details

A critical discussion of concrete bridge details based on recent extensive field observations is contained in a new 48-page illustrated booklet which was reviewed before publication by several leading bridge engineers and which presents observations with a spirit of open-mindedness and offers constructive suggestions for improved details. Among the subjects discussed are abutment movements; wing walls; bridge seats; bearings; expansion joints; prevention of seepage; wearing surfaces; hand railings; construction of approach slabs; and creep in skew bridges.

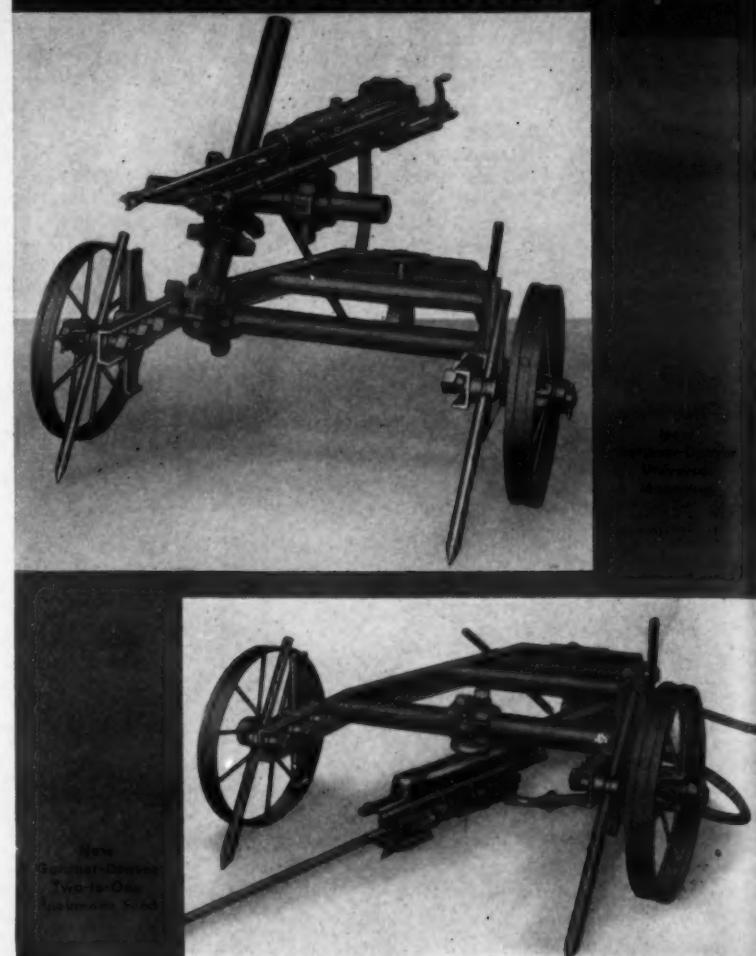
For the first time in concrete literature, proper emphasis is placed on the correct treatment of details. The purpose is to improve construction of con-

crete bridges which ultimately produces the desired quality: longest life with the least cost of upkeep. Copies of this

booklet may be secured from the Portland Cement Association, 33 West Grand Ave., Chicago, Ill.

## For Drifting Drill Speed on Jackhammer Jobs Use the Gardner-Denver Universal Mounting

### "A TRIPOD ON WHEELS"



• Down holes, snake holes, toe holes—holes close to the face or close to the floor—all can be drilled at any angle from the Gardner-Denver Universal Mounting.

The easily adjustable post and arm make it possible to swing the drill into any position, by loosening a few nuts.

Any type or size of Gardner-Denver drifting drill may be used

with standard screw feed guide shell, or on the new Gardner-Denver Two-To-One Pneumatic Feed.

The wheels can be quickly adjusted to compensate for uneven ground. Steady points are provided to prevent movement of the mounting while drilling.

**INCREASE YOUR DAILY YARDAGE—YOUR MONTHLY ESTIMATE—MAKE USE OF DRIFTING DRILL SPEED ON YOUR JACKHAMMER JOBS**

**GARDNER-DENVER COMPANY**  
102 Williamson Street  
Quincy, Illinois

Horizontal, Vertical, Air-Cooled and Portable Compressors • Steam and Power Pumps • Rock Drills, Accessories • Paving Breakers • Clay Diggers • Hoists

**GARDNER-DENVER**  
MAKES AIR DO MORE AND COST LESS



### FROM THE NORTH

Pole



Great discoverers, when seeking comfort, service and exclusiveness in modern hotel life, have made their greatest discovery at the Willard—Washington's most celebrated and conveniently located hotel.

The

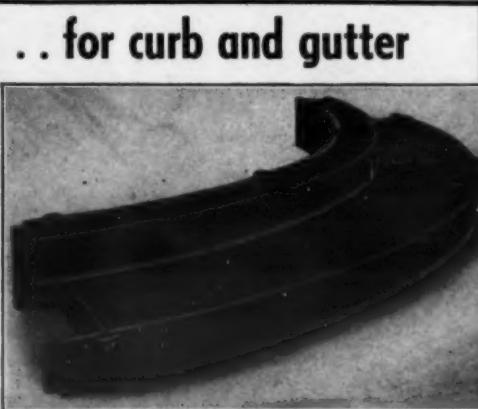
**WILLARD HOTEL**

"Residence of Presidents"

WASHINGTON, D. C.

H. P. Somerville, Managing Director

## HELTZEL STEEL FORMS



In cutting back and widening dangerous corner intersections, this Heltzel equipment is ideal, saving in time, labor and money!

Write for Bulletin 200, describing complete Heltzel line.

THE HEITZEL STEEL FORM & IRON COMPANY  
WARREN, OHIO • U. S. A.

Heltzel Rigid Radius Forms are made in sets and to any radius required, for curb, sidewalk, or combined curb-and-gutter construction. Their initial low cost makes them an economical investment!

**Portable Lubrication Unit  
Maintains Equipment  
for Kansas Contractor**

A successful portable system for the lubrication of construction equipment has been adopted by the List & Clark Construction Co., of Kansas. This company, which operates extensively in the western part of that state, has experienced considerable difficulty with the dust and sand so prevalent in that territory these past months. Many men and much time were used in carefully lubricating the vast array of shovels, graders, dump wagons, tractors and other equipment owned by this contractor. The cost of operation and labor was mounting, and expensive machinery was endangered, due to the difficulty of keeping the equipment properly lubricated.

To solve this problem, a simple but effective lubrication unit was constructed and mounted on a 1½-ton truck,



The Lubricating Outfit Used by List & Clark

consisting of an Alemite Power Lubri-gun, a small compressor operated by a gasoline engine, an electric light plant, oil barrels containing different grades

of oil, and a storage tank for lubricant. With this outfit, List & Clark has been able to lubricate all its construction equipment at night, the truck mounting

making it possible to move rapidly from one piece of equipment to another.

The Alemite Powergun equipment is a new development, designed to do away with inadequate, slow and costly lubrication. Mounted on a truck or trailer, the outfit is easily portable; few men and little time are required to handle all the lubrication necessary; and the tons of pressure necessary for proper lubrication are ever ready at the operator's finger tips.

**Equipment Division  
Announced by Blaw-Knox**

Blaw-Knox Co., Pittsburgh, Pa., has announced the formation of a Construction Equipment Division, merging the Road Equipment Department, Clamshell and Dragline Bucket Department, Dirt Moving Equipment Department, Bin and Batcher Department and Truck Mixer Department. This centers these interests under Robert T. Harris, Manager, assisted by the former departmental personnel.

# Consider THE WHOLE UNIT

"We ain't hollering about no one gadget or feature." After all, every part that goes into Link-Belt machines must be a champion performer. Link-Belt tolerates nothing but the best throughout the entire structure. When choosing, it's the quality of the entire unit that counts.



## STABILITY-POWER-SPEED

From  $\frac{3}{4}$  to 3 yards capacity, heavy-duty built. Gas engine, Diesel, or electric motor drive. All models can be shipped loaded on a flat car without dismantling.

**LINK-BELT COMPANY**  
300 W. Pershing Road  
**CHICAGO**

Offices and Distributors in All Principal Cities  
5084-C

**LINK-BELT**  
**SHOVEL-CRANE-DRAGLINE**

## Relief Employment Hits Skilled Labor

(Continued from page 1)

entiate between a man on relief in X County and a man on relief in Y County. It is simply the case of one man on relief. The experienced skilled laborer is permanently established, is a definite part of an organization, trained by the contractor and in many instances carried through the non-working periods with funds or a job created solely for the purpose of keeping the organization intact; there is nothing to be gained in placing this man on his local relief roll and in his place on a job which the contractor is running in another county, placing an unskilled, inexperienced and careless man in the skilled man's job simply to relieve the unemployment situation in the community where the particular project is located. Nothing has been gained by shifting this burden of employment from one county to another. In fact, this procedure actually penalizes the man who has spent years of conscientious effort in becoming efficient in his work as a skilled laborer or operator of equipment and presents his job to an incompetent unskilled individual.

### Local Labor Predominates

To prove that it is reasonable to consider the state as a whole, look at the following facts from the Illinois State Highway Department. In 1933 when the contractor was free to select his labor where and as he pleased, and was in no manner concerned or hampered by employment agencies, of 32,044 laborers employed by contractors on Illinois highway projects 89 percent were local residents living within the vicinity of the job, 10 percent were non-local, but residents of Illinois, and the remaining 1 percent were non-residents of the State. These figures include executives, administrative, skilled and unskilled employees. Is this not evidence that if the contractor is not hampered by employment agencies he will, of his own volition, keep his labor requirements confined within the boundaries of the state in which he is operating?

### Trained Operators Necessary

The contractor uses highly specialized equipment, designed and built for his specific purpose, and requiring skill and ability to operate it properly. There are certain classifications of labor on paving, bridge and grading work that, under no circumstances, can be properly filled by untrained local citizens. No contractor can go into a rural community, and build a complicated highway project, using local labor, and keep within the limit of his estimate. There is not one of us who has not either tried it and

hopelessly failed, or who has not had first hand observation of a failure by other contractors.

### Untrained Labor Costly

On small projects, under the present set-up, the job invariably is completed before the new laborers have actually become acquainted with or adapted to their respective duties. Consequently, the job is a disintegrated mad house from start to finish. On projects that are large enough to be prolonged over an appreciable period, hiring, rehiring, instruction, delays from discharging, and the general inefficiency takes up so much time that equitable progress is impossible. Case after case of overrun of completion dates are today quite common.

Quality of workmanship and final results are receiving no end of criticism from the Highway Departments. The Departments are inclined to be as lenient as the ethics of their positions will permit. They have certain standards of excellency which they strive to maintain, but the disintegration of the dependable

labor structure is wrecking these standards.

### The Penalty the Contractor Pays

Our company's equipment maintenance costs have actually doubled since we have been under the relief employment agency's regulation. This condition has been carefully checked with contractors over the entire country, and their figures uphold ours. A very reputable grading contractor reports that his maintenance costs have increased 6 cents per cubic yard of earth excavation. Surely there could be no intent of loading such a burden on any industry. Local labor is wrecking expensive equipment, while efficient operators remain in their home communities idle and begging for jobs which rightfully belong to them. Nothing has been gained, no relief of unemployment has been accomplished. In addition, this condition has destroyed the incentive and the desire of the skilled laborer to be efficient. The trained man realizes that his opportunity for work is confined to a limited area, and the man from the employment agency realizes

that when this particular project is completed his career as a highway employee is at an end.

(Continued on page 29)

## Light Up Your Job

—with this new, guaranteed 5 K.W. D. C. (5000 Watt) direct connected generating plant.

**Only \$395.00 F.O.B. Milwaukee**

Weight complete, 660 lbs. Immediate shipment can be made.

Let us send you literature

**LeRoi Company**  
Milwaukee Wis.

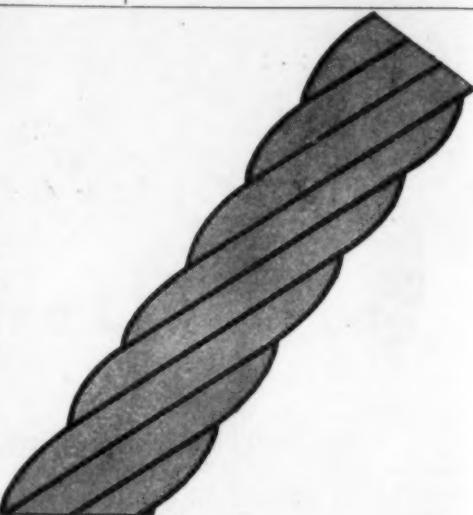


## YES, YOU'RE RIGHT All Wire Rope LOOKS alike . . .

. . . before you put it into service. Some people believe that's true about race horses too . . . before the race.

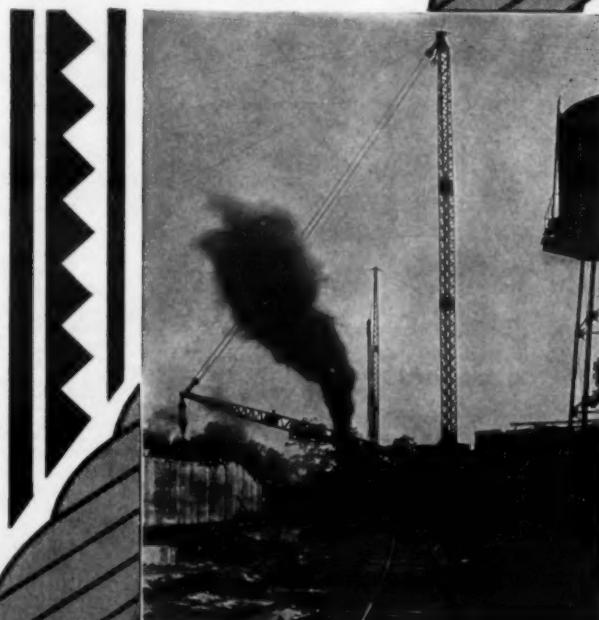
But getting back to wire rope; you can depend upon it that Williamsport Wire Rope can "take it" and after all that's what counts. You want a product that's made by experts, from rods of uniform quality. Williamsport sees that you get just that. We draw our own wire . . . we make all of our wire rope—we make nothing else.

Don't you think that should make our organization more efficient? Their living depends upon doing one thing to perfection. Send for our new Wire Rope Catalog now on the press. It will interest you.



We can cite many very tough jobs that proved the uniform superiority of Williamsport Wire Ropes for strength and endurance.

Ask us about our "Form Set," made the way Preformed ropes should be made.



# Williamsport

WIRE ROPE COMPANY

Main Office and Works: WILLIAMSPORT, PENNA.

Branch Sales Offices: 122 S. MICHIGAN AVE., CHICAGO

**PILE HAMMERS  
and  
EXTRACTORS  
HOISTS - DERRICKS  
WHIRLERS**

•  
*Special Equipment  
Movable Bridge Machinery*

•  
Write for descriptive catalogs.

McKERNAN-TERRY CORP.  
19 Park Row, New York  
Distributors in Principal Cities

C. & K. M. Photo  
A New Road Roller to Eliminate Bumpometer Bumps

### A New Extension Road Roller To Keep Bumps Out of Asphalt

It was prophesied nearly a decade ago that when highway officials and the manufacturers of asphalt paving equipment wrote specifications and built machines that produced pavements as smooth as the more expensive types, then bituminous paving would receive the recognition of the public. That time seems to have arrived. We now have 10-foot specified straight-edges for checking the pavement and Ohio demands not more than  $\frac{1}{4}$ -inch bumps in 10 feet in its hot-mix, hot-laid pavements. The asphalt finishing machine has done much to bring about smoother, more uniform texture hot-mix pavements and steps have been taken to provide roller equipment which will complete the job.

A new 10-ton extension roller has been placed on work in California and Ohio by the Buffalo-Springfield Roller Co. of Springfield, Ohio. The new machine has four wheels, the new fourth wheel being placed ahead of the standard front roll and the machine has a wheel base of 16 feet  $\frac{3}{4}$  inches. The two front rolls, one behind the other, steer on the same radius, and one or both of the front rolls are always in contact with the surface; hence, the machine is steerable at all times. An in-

dicator on the king pin of the front roll shows all bumps in the pavement so that the roller man knows just what he is doing.

The diameter of the two front wheels is 36 inches and both are 40 inches wide. The rear wheels are 60 inches in diameter and 20 inches wide with an overlap of  $\frac{1}{4}$  inches over the front wheels. All four rolls are machine faced to insure uniform smoothness.

This extension roll machine has a compaction of 100 pounds per linear inch more than a standard 10-ton tandem roller.

It is interesting to note that on the first job on which one of these rollers was used in the east, on a state highway in Ohio, in the first mile of rolling there were only two bumps. The first was at a hand-raked street intersection and the other at a catch basin near the curb where it was not deemed advisable to run the new roller over the casting.

Another observed feature was the actual added pressure exerted by the second roll when it rested on a high spot. The roller was in reverse, stopped and started forward with the second roll on a high spot. The first roll, clear of the pavement by a small fraction of an inch, continued to turn in reverse until the machine moved forward a few inches and the front roll reached the surface again. Then it stopped and started to roll forward with the machine.

### New Roadside Crushers Handle Oversize on Job

A new portable roadside crusher for road maintenance and construction which enables the user to reclaim valuable supplies of oversize with economy has recently been announced by the Iowa Manufacturing Co., Cedar Rapids, Iowa.

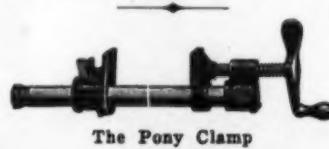
This crusher, which is particularly designed for use in maintenance and the construction of low-cost gravel roads, is a self-propelled plant which can be quickly and easily moved from one location to another. The crusher and tractor are built into a single unit. The crusher is set ahead of the tractor and is fed by a front-loading power-driven skip. Aggregates to be crushed are windrowed in the middle or near the side of the road. The tractor then drives the skip into the windrow until it is fully loaded. The skip is then raised by tractor power and its contents discharged into the crusher.

When crushed the aggregates drop onto the road where they are available for spreading. Since the bottom plate of the skip is perforated, only material of the correct size drops through onto the road, the oversize being delivered to the crusher.

These Models 912 and 916 units with skip feed are 29 feet long, 5 feet 6 inches in width, and 11 feet 4 inches in height, overall measurement. The skip capacity is  $\frac{1}{3}$  yard.

The same size crusher is also offered in a portable tractor-driven unit of the

hand feeding type and the 916 crusher is available in a trailer unit for use with a crawler-type tractor.



The Pony Clamp

### Novel Steel Bar Clamps

Pony bar clamps, which are so designed as to make ordinary  $\frac{3}{4}$ -inch steel pipe serve as the bar, are made by the Adjustable Clamp Co., 427 No. Ashland Ave., Chicago, Ill. The pipe may be either standard or extra-heavy, with American or British pipe threads. The clamps may be secured complete, or the fixtures only may be obtained and used with pipe on hand. No tools of any kind are needed to apply the fixtures.

Adjustment is secured by the multiple disc clutch which grips the bar automatically at any point and permits fitting the clamp to the work, the screw being required only to apply pressure. The foot is never loose on the bar, but is easily released by finger grips. The castings are of malleable iron, the clamping faces  $1\frac{1}{4}$  inches square. The screw is of cold-drawn steel  $\frac{5}{8}$ -inch in diameter, with deep coarse threads. The handle is one-piece and indestructible.

This company makes a complete line of clamps, of which the Pony is only one, all of which are described in Catalog No. 10 which may be secured direct from the company.

*This is the unit that*

# ETNYRE

*built*

**to improve an already remarkable line of bituminous distributors**

1. *A more compact assembly* of pump, valves and circulating system reduces the weight about 300 pounds, permits the unit to be mounted 4 inches lower on the truck without reducing the road clearance of the spray bars, makes insulation easier, and allows the valves to be readily heated from the motor exhaust.
2. *The new leakless valves* eliminate the drip-drip which has up till now been so annoying to operators.
3. *The new fifth-wheel-driven tachometer* is proving more accurate and satisfactory than either front-wheel or transmission drive. The fifth wheel is raised, when the truck is on the way to or from a job.

504—Write just this number—504, on a post-card, with your name and address, and we shall be glad to send you a copy of our Bulletin No. 504 which will give you further interesting facts concerning this new ETNYRE.



## E. D. ETNYRE & CO.

DEALERS IN ALL PRINCIPAL CITIES

400 JEFFERSON ST.,

OREGON, ILL.



MODEL FO2

## Methods of Driving Baltimore Tunnel

(Continued from page 8)

muck was carried back in two trains of three 2-yard cars running on two narrow-gage tracks to the shaft. Before the open cut at the Washington end was completed, these trains of 2-yard dump cars were taken up on one of the electric elevators and dumped into the hopper for truck disposal as described for the side-drift mucking.

After the Washington end open cut was completed, the muck was loaded by the mucking machine into 2-yard bottom-dump boxes, one of which was mounted on each industrial car. These were run back under a gantry which picked them up and dumped them into a 30-yard Western air-dump full-gage railway running on a track set along the center line of the tunnel. These cars were hauled out by an electric locomotive to the portal where the Pennsylvania Railroad picked them up and disposed of the muck on a railroad dump.

When the side drifts were holed through to the Philadelphia end, mucking of the main tunnel was handled by trains of two cars with one Whitcomb locomotive for each train, running through the two drifts outside the tunnel where a Lorain 75A crane picked up the bottom-dump boxes and emptied them into a hopper from which trucks hauled the muck for disposal. This method of mucking was used for the last 200 feet of the main tunnel.

There were six muckers working on the invert of the tunnel. Their work consisted of grading ahead of placing steel and concrete in the invert.

### The Machine Shop

A very complete machine shop was set up on the job on a street which was closed off to through traffic. The shop consisted of a galvanized house 45 x 14 feet, housing an Allis-Chalmers 40-horsepower electric motor which drove the jack shaft for operating the 18-inch American lathe, a power hack saw, a 14-inch Barnes drill press, a Greenfield bolt machine, and a grinder. The equipment also included K & G oxyacetylene cutting and welding outfit, which were used frequently. The shop was able to make repairs on practically all equipment used on the job and also to make fittings for certain parts of the equipment.

### Concreting

The sequence of concreting, exclusive of grouting operations, was as follows: 1. pouring the footings and wall sections in the two drifts; 2. pouring the invert and 3. pouring the sidewalks at the spring line of the tunnel section.

All concrete was furnished by the Arundel-Brooks Corp., a subsidiary of the general contractor, which maintained a batching and central mixing plant on the water front about 2 miles from the Valley Street shaft. The concrete was fully mixed in a 5-yard mixer at the central plant and placed in 4 or 5-yard Rex Moto-Mixers to be hauled either to the Valley Street shaft for chuting to the hopper car in the tunnel or to the Rex Pumpcrete machine which was set up successively at 200-foot intervals along the drifts.

A most ingenious method was used to deliver the concrete to the drifts for pouring the walls and footings. The contractor put down 10-inch well drill holes every 200 feet ahead of the drifts and inserted 6-inch steel pipe in these holes through which concrete was delivered by the Rex Pumpcrete. The steel forms were set for the face of the footing and side wall only, using the liner plates as the forms for the base and back of the wall. Six or seven liner plates of each ring were thus left in place, the remainder being salvaged for use ahead.

The Pumpcrete has a capacity of about 25 yards per hour in placing concrete. The footing and wall sections poured by this machine required 4 yards of concrete per linear foot. The Pumpcrete unit was set up at an appropriate elevation on cribbing near the pipe leading to the drifts and a heavy wooden ramp carefully constructed up which the Rex truck mixers backed and delivered the mix to the top of the concrete pump, in charges of 1 cubic yard each.

All concrete for the main invert was delivered by the Pumpcrete in the same way in which concrete was delivered for the wall and invert in the side wall drifts. The concrete for the walkways was delivered by the truck mixers to a hopper at ground level at the Valley Street shaft. Semi-circular chutes carried the concrete down to a control hopper at the bottom of the shaft which delivered to three side discharge hoppers of one yard capacity each, mounted on a

standard gage railway car. These hoppers were run along the tracks until the section of the walkway to be poured was reached and the concrete chuted direct into the forms.

### Labor Organization and Shifts

The total number of men for three shifts on the shield tunnel was about 350, as a maximum.

### Personnel

The contract for the new Union Tunnel of the Pennsylvania Railroad was awarded to the Arundel Corp., Baltimore, Md. The work was under the direction of J. V. Hogan, President and C. W. Black, Chief Engineer, with W. G. Armstrong as Resident Engineer and Harry Redwood, Superintendent. For the Pennsylvania Railroad, the project was under the direction of W. D. Wood, Engineer of Baltimore Improvements for the railroad with D. A. Leisher as Resident Engineer. Jagies Forgie of New

York was Consulting Engineer for the Pennsylvania Railroad on this tunnel project.

## 10,000 Low-Priced Trucks To Be Built by White

A new streamlined Indiana truck in the low price field, 10,000 of which will be built this year, has recently been announced by the White Motor Co., Cleveland, Ohio. This new model, of 11,000 pounds gross capacity, is designed to fit the requirements of contractors and highway departments for light-duty trucks.

Modern streamline appearance is a feature of the chassis, achieved by the use of deep-skirted fenders, cadmium-plated radiator grille and louvers, and a sedan-type cab. Other features are a powerful 6-cylinder 263-cubic inch engine, hydraulic brakes and ventilated disc wheels.



Here is something more than a new hauling unit... it is an entirely new method of moving dirt... at faster speeds and at lower cost than has ever before been possible. The new Allis-Chalmers Speedster hauls 6 to 8-yard loads... at speeds ranging up to 16 miles an hour. Turns "on a dime" for quick easy spotting. Works anywhere... in loose dirt, sand, gravel, rocks, gumbo, on steep slopes. Big, low-pressure tires roll over ruts and bumps, providing ample traction and efficient use of power. A single-unit hauling outfit... designed and built specifically for dirt hauling... powered by a proven tractor engine. Contractors who have used the Speedster say it beats anything they have ever seen for high speed dirt moving. Why not be among the first to take advantage of this better way to move dirt?

**ALLIS-CHALMERS**  
TRACTOR DIVISION—MILWAUKEE, U. S. A.

## Lawrence Machine & Pump Taken Over by V. J. Mill

Victor J. Mill of Baldwinsville, N. Y., has purchased the Lawrence Machine & Pump Co. of Lawrence, Mass., and will continue to operate it under the name of Lawrence Machine & Pump Corp. This company, which was established in 1882, made the first centrifugal pump in the United States, and at its peak shipped 1,000 to 1,500 pumps annually to all parts of the world.

Mr. Mill, who has been prominent in the industry for nearly 20 years, plans to continue the Lawrence line of pumps, with many new improvements in design. The line will include centrifugal pumps for a varied field, including single and multi-stage water pumps, stock pumps, sewage and sludge pumps, chemical pumps and sand and dredging

pumps. In addition the plant will build hydraulic dredges and special machinery, a field in which Mill has had wide experience.

A graduate of Sheffield Scientific School, Mill's practical experience covers four years with the General Electric Co., two years as field engineer on hydraulic construction with Jas. Stewart & Co., a year as field engineer on general construction with Standard Oil Co. of New Jersey, and 19 years with Morris Machine Works, the last eight years of which he served in charge of engineering and sales and as a director of the company.

Speaking of safety practices, one company said recently: "Our experience has been that whenever we made a job safe we also increased production from 15 to 150 per cent." Just another reason for practising safety.

## New Shot-Firing Cords

Two new types of all-rubber shot-firing cords, both of which because of their small diameter, flexibility and light weight are of interest to the operator who is required to carry long lengths on the job, have been announced by the Merchandise Department of General Electric Co., located at Bridgeport, Conn. One of these cords is a round type, the other a parallel-type cord and both have a red rubber finish.

The round-type cord is especially suitable for battery shooting in wet or damp places. Its all-rubber construction makes it resistant to abrasion and mechanical injury, as well as to the action of oil, acid or gas.

The parallel-type cord is of flat rubber construction and provides satisfactory service under ordinary conditions where initial low cost is a factor.

## If Your Engine Fails

### Tips on Trouble Hunting for One of the Causes of Truck Breakdowns

By FREDERICK W. KOERBER

ENGINE operation depends upon three principal factors: uninterrupted fuel supply; constant ignition; and adequate compression. It is a well-recognized fact that engine trouble never occurs at a convenient time or place, and it therefore behoves truck drivers to know something about "trouble shooting" to meet such emergencies, as well as to save many dollars for the owners of the trucks.

If a truck engine has been running satisfactorily and then suddenly stops without any noticeable cause, it means either the fuel supply has been cut off or the ignition has failed. The first step is to determine which of the two is at fault, assuming of course that the operator hasn't just run out of gas.

If the fuel tank is in proper order and filled, proceed with the next check. A common cause of fuel system trouble is the excessive use of the choke in starting the car which results in flooding the cylinders with unvaporized fuel which, consequently, will not fire. Another evil of this practice is the contamination of the crankcase oil with the raw fuel which acts to break up the body of the oil, thus reducing its effectiveness for lubricating purposes.

To test for flooded cylinders, set the choke in "Running" position, and crank the engine about ten seconds with the throttle partly open. If the ignition is not at fault and the engine still does not fire, it can safely be assumed that the cylinders are not flooded with raw fuel and the difficulty must be with the fuel flow, the test for which follows:

#### Test for Faulty Fuel Supply

1. Open the carburetor drain cock or loosen the drain plug of the fuel pipe at the carburetor. If the gasoline flows in a steady stream, the remainder of the fuel system is not at fault.
2. Sometimes water or sediment in the carburetor will cause the engine to stop frequently, due to the interruption of a steady flow of fuel. Clean the carburetor to insure against this danger, then clean the drain cock with a piece of wire.
3. Test the fuel pipe by disconnecting both ends and blowing through or by using a tire pump to force the dirt out.
4. Remove the strainers in the carburetor, the vacuum tank and the fuel tank, and clean.
5. Test the vacuum tank by removing the plug at the top and filling with gasoline. Clean out air vent in vacuum tank, if clogged. If, after this supply has been used up, the engine stops, then check further as follows:
6. See that the suction pipe from the vacuum tank to the carburetor is not loose, for this will prevent the operation of the vacuum tank itself. If the suction pipe is found loose, tighten all connections and apply shellac or soap to prevent air leakage.
7. If the carburetor drips gasoline continuously, either the carburetor float needle valve is clogged with dirt or the float has sprung a leak. The first step is to drain the carburetor and clean out the screen that is provided to catch the sediment. Next remove the float needle cap and raise or depress the needle to cause excess flooding; then twist the needle against seat. Start engine. Carburetor should then function properly unless the vacuum tank float leaks.
8. If flooding of carburetor continues, a leak in the tank float is undoubtedly the cause. In this case, the leak must be repaired or if too badly damaged, a new tank float will be necessary.
9. In order to get the truck to the company's shop or a nearby service station, where the repair or replacement can be made, disconnect the suction pipe to the intake manifold, plug the manifold connection, fill the vacuum tank through the filler plug and then drive to destination.
10. See that the carburetor choke control connection is properly adjusted and tight.

The above check will reveal the difficulty in the fuel supply, if that is the source of the trouble. If, however, the fuel supply is found not to be responsible, the next possible causes to investigate are the ignition and compression. The procedure for checking these will appear in subsequent articles.

"Highway building is a dynamic and continuing responsibility. Highways grow better or grow worse. They can not stand still with twenty-five million motor vehicles in daily operation."



Turns in its own tracks... at greater than 90 degree angles. Independent clutches and brakes permit quick spotting for loading and speedy action at the dump. High arch permits tractor to undercut.



Big, low-pressure tires have large area in contact with the soil, providing ample traction for big loads, steep slopes and rough going. Exceptionally low hitch aids traction and ease of control.



Hauls 6 to 8-yard loads at speeds up to 16 miles an hour. Four speeds forward—2.5 to 3.7, 5.8, 10.5 and 16. Less dead weight means greater pay loads and higher speeds.

# THE NEW SPEEDSTER

**ONE MAN UNIT.** One man operates the new Speedster unit. Braking, dumping and loading operations are vacuum controlled from the tractor dashboard. High clearance eliminates "hanging up" on the dump. Low hitch prevents "raring". Cushion hitch provides stability with flexibility.

## Excavation— Wet and Dry

(Continued from page 2)

### Cofferdams

Cofferdams for the work to be excavated in the dry were started in the summer of 1932 and were finished in 1933. They were built with rock secured from disposal areas and with clay dredged from the river bottom. When they were unwatered, some leakage was found, mostly at the bottoms, but this was largely overcome by trenching along the lower outside face of the dykes and filling in with straw and clay. Deep water and a fast current challenged the skill and resourcefulness of the contractor.

### Dry Excavation

Dry excavation on Section B was started in December 1932. After the cofferdam was unwatered by the pump-scow, some loose material was found as a result of previous submarine shots. This was removed by stripping before excavation started. Then holes were drilled about 7 feet deep on 5 x 5-foot centers. When a sufficient number of them were loaded, usually from 300 to 600, all charges were connected in parallel series and the shot fired electrically from a power circuit.

The broken material was removed by two draglines working side by side, but with the one near the center of the cut slightly in advance of the other. The leading machine, with a 3½-yard bucket, cleaned a strip 150 feet wide, casting the material toward the side. Then the larger unit with a 6-yard bucket and a 175-foot boom, picked up and carried the rock outside the cut, dropping some of it on the dykes. The dykes were not permitted to exceed a height of 10 feet above the surface of the river, so small draglines and bulldozers leveled them off.

Very little secondary blasting was needed, except in a few cases where the rock ledges outcrop. Sometimes, after a shot, the men found pieces of stone slab too large for the draglines to handle. These were broken down with jack hammers.

Considering weather conditions and the difficulty of building cofferdams in deep water, this work has progressed very satisfactorily. Sections B and D are finished and the plant is now moved into Section E.

### In the Wet

While some of the wet work was started in 1932, it did not actually get under way until early the following year. The method of operation on these sections has been to use the customary drill-boats drilling holes on centers ranging from 8 x 8 feet to 10 x 10 feet to a depth of 34 to 36 feet below mean water level. When the dynamite was loaded, the boat pulled away to a safe distance, and the charges were fired in

ranges.

A dipper dredge of 8 cubic yards capacity moved up to gather the broken material, loading it to scows which were towed by tugs to the dumping grounds. Sweep-scows next worked over the excavated area to determine if there were any high spots, and if any were found, they were removed. Section A is drilled and blasted, while C is finished, and F is drilled and for the most part excavated.

### Handling Dynamite

The dynamite used by the contractor was shipped to Amherstburg, Ontario, where it was transferred to scows and carried across the river to Powder House Island. Daily, service boats delivered du Pont explosives to the various work locations.

### Personnel

The Arundel Corp., Baltimore, Md., was the successful bidder for this contract. The operation was placed in charge of E. S. Johnson, Superintendent and J. N. Shlessinger, Engineer. Arundel

decided that the material in three sections could best be excavated in the wet and that cofferdams would be built for the dry excavation on the other three sections. The construction of part of the cofferdams was sublet to Dunbar & Sullivan Dredging Co. and the excavation in the dry was sublet to George Mills & Co., another Detroit contractor. The Arundel Corp. elected to handle all of the subaqueous rock excavation itself, and used its own fleet of drill boats, tugs, dredges, sweep scows, dump scows and other floating equipment.

The material and illustration for this article are used through the courtesy of du Pont Magazine.

### Crane Co. New Dealer for Bucyrus-Erie

The F. C. Crane Co., 1301 S. Lamar St., Dallas, Tex., has been appointed distributor for Bucyrus-Erie power shovels, draglines, cranes, clamshells and skimmer scoops in the central and eastern sections of Texas. In addition to new excavating equipment from  $\frac{3}{8}$  to 2-

cubic yards capacity, the Crane Co. will also carry a complete stock of repair parts for all current machines as well as the older types of small machines.



**Resharpen Your Rock Bits**  
with a Quick-Way Bit Grinder.  
Resharpen them again and again at a cost of from 2c to 4c per bit.  
**C. H. CARLSON MFG. CO.**  
13-15 Main St. N. E. Minneapolis, Minn.

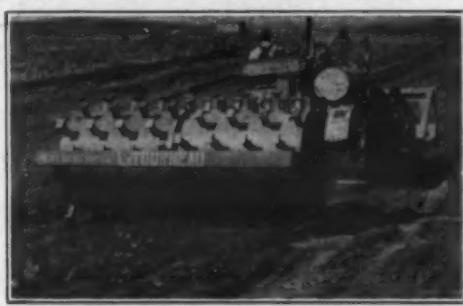
## SHOVING COSTS DOWN



The versatile LeTourneau Angledozer on a highway job



(Above) A typical Carryall Scraper load  
(Below) Sheep's Foot Roller on a reservoir fill



Easy because LeTourneau Equipment moves more yardage and moves it faster.

Moves more yardage because the LeTourneau Power Unit gives the operator trigger-quick control of LeTourneau Equipment — no time lost waiting for pressure build up.

Moves more yardage because LeTourneau Units are built by arc welding of special steels to take the battering of the toughest jobs — breakdowns and repair costs are practically nil.

Moves more yardage because heavy duty bearings and big pneumatic tires lighten the draft of Carryalls and Buggies, because a correctly curved bowl keeps the dirt rolling in front of Bulldozers and Angledozers — less tractor power is wasted overcoming friction, more power is available for payloads.

Ask for Data Sheet Proof — You don't have to "guesstimate" when considering LeTourneau Equipment. Our Engineers are constantly gathering detailed, on-the-job facts and figures. If you will write us describing your problems, our Engineers will gladly supply you with data sheets telling how other contractors have whipped similar problems.

**R. G. LE TOURNEAU, Inc.**  
PEORIA, ILLINOIS STOCKTON, CALIFORNIA

Manufacturers of: Angledozers, Bulldozers, Buggies, Carryall Scrapers, Derricks, Rooters, Sheep's Foot Rollers, Power Control Units.

## CONCRETE VIBRATORS

Air operated vibrators for all classes of concrete construction including Bridge deck slabs, Dams and Locks, Highway pavement and Concrete products.

Write for circulars and engineering data.

## MUNSELL CONCRETE VIBRATORS

997 West Side Ave. Jersey City, N. J.

# LE TOURNEAU

## How the Other Fellow Did It

Ideas Which Have Already Proved Helpful to Contractors

### Holder for Marginal Bars in Concrete Pavement Slabs

**362** Guy B. Maxey of S. O. Maxey & Co., of Durant, Okla., paving contractor, believes that each job offers a fresh opportunity to try out a new device for making the work easier and more accurate. On his 3-mile NRH contract at Walters, Okla., this past spring he put into use a clever device for holding the pairs of marginal bars at the proper positions.

The holder was of welded sheet metal 6 inches wide, the distance of the bars from the forms, and 10 inches high, the depth of the forms. It was about 3 inches thick and had a lifting handle on top and two projecting rods for holding the bars at the correct elevation. When thrust into place on the grade the handle was naturally pushed down and the two rods forced out by a cam arrangement inside. When the concrete had been placed around the device supporting the bars a pull up on the handle first released the two rods holding the bars and then lifted the device clear of the concrete.

The supporting rods had to fit the holes rather closely so that grout would not leak in and clog the springs which pulled the rods back when the cams were released by lifting on the handle.

### Welding Generator "Sleuths" for Plugged Conduit

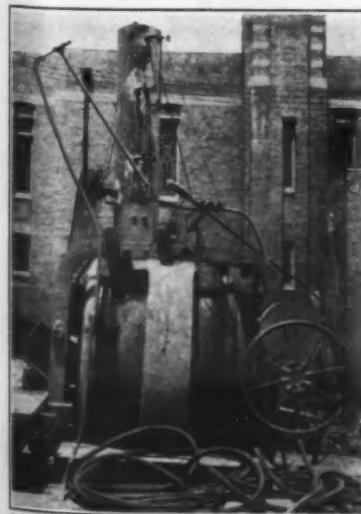
**363** In pouring concrete in a large power-house recently, some conduits became plugged with cement. Since no one knew exactly where the pipes ran in the floors and walls, the problem was to locate them without digging up unnecessary parts of the flooring. By connecting the electrodes from the Westinghouse welding set to the ends of the pipes and using an ordinary compass, it was possible to draw a chalk line over the pipe in trouble. Then a fish tape was used to measure the distance from the ends to the plugged portion, making it possible to break out the concrete directly at the point of obstruction.

In spite of the fact that the pipes were 14 inches below the surface half an inch or less deviation from the direct line could be detected with the compass needle.

W.E.M.C.:35

### Handy Measuring Device for Water for Concrete

**364** Because of difficulty with a water-measuring device and the need of constantly resetting it for the different amounts of water needed according to the per cent of moisture in the aggregates, the C. G. Kershaw Con-



C. & E. M. Photo  
House Hot-Water Tank Mounted Over Mixer for Measuring Batch Water

tracting Co. of Birmingham, Ala., rigged up a device for its concrete mixing plant.

An ordinary house hot-water boiler was set up vertically on top of the mixer, with a pair of water gage glasses to show the height of the water in the boiler. The boiler was calibrated and was found to hold one gallon for each  $2\frac{1}{8}$  inches of height. Wood strips were marked with the amount of water and securely wired to the gages. Then a pipe was set in near the bottom of the boiler and left free to swing and with the upper end open. By setting this open end at the elevation of the water desired in the tank it was possible to prevent any excess water being used in the mix. The pipe was held in place by a heavy wire but could be adjusted in a moment.

469:34

### New Trucks for Virgin Isles

Six 1935 Ford V-8 trucks, equipped with  $1\frac{1}{2}$ -yard Galion bodies, have recently been purchased by the U. S. Department of the Interior for delivery to the Virgin Islands where they will be used in general road and forest improvement work.

The bodies measure 84 inches long, 66 inches wide, and  $12\frac{5}{8}$  inches high and are fitted with hydraulic hoists. The double-acting end-gates are controlled by a lever placed near the driver's seat.

### Shear Plate for Dowel Increases Effectiveness

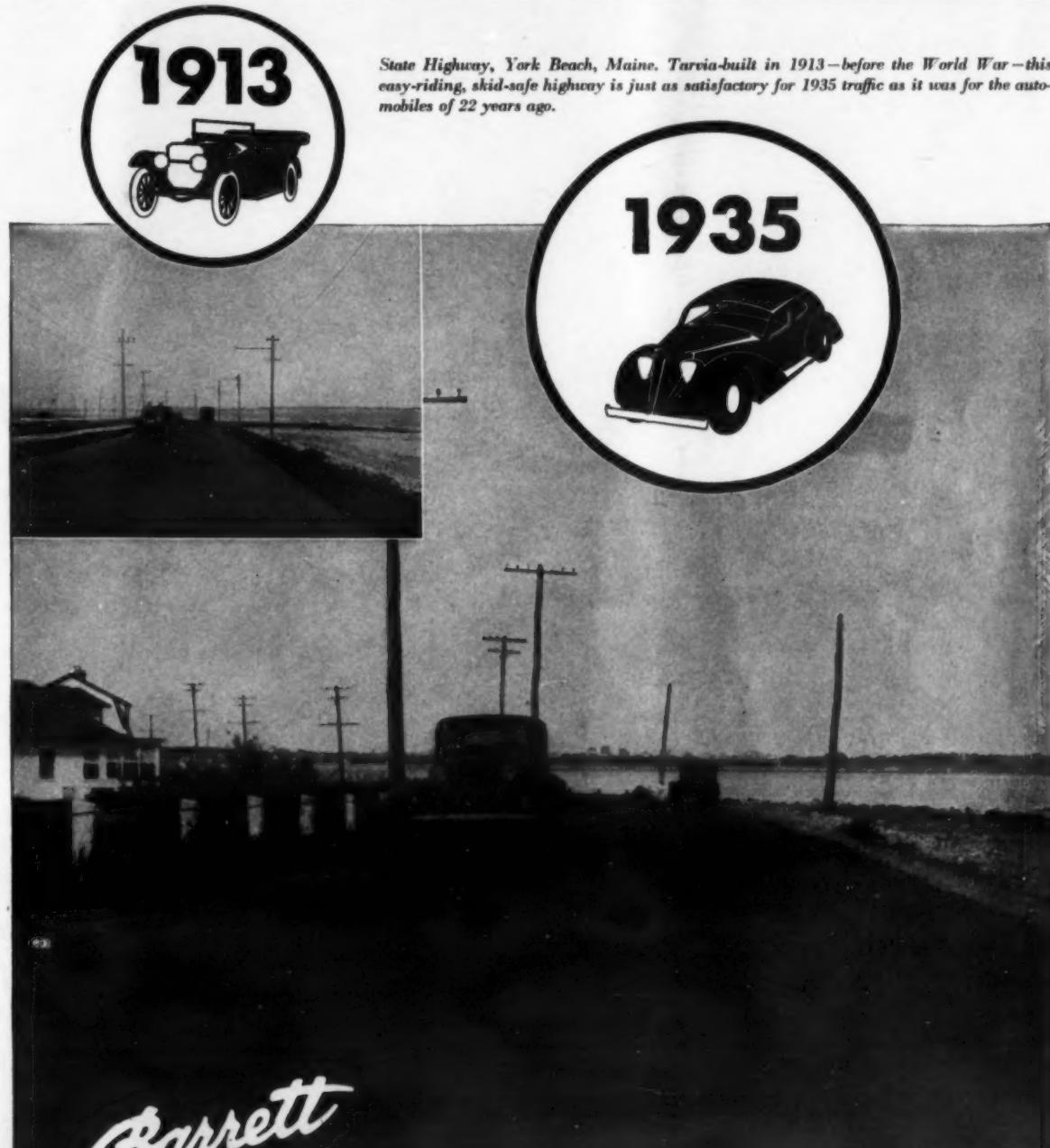
The standard round dowels used to connect adjacent slabs through an expansion joint tend to crush the concrete and bend the dowel if there is relative vertical movement between the two slabs. The Heltzel Steel Form & Iron Co., Warren, Ohio, has developed

shear plates from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch thick, 4 to 12 inches wide and 3 inches high, which are well anchored 4 to 6 inches into the body of the slab to prevent damage to the concrete. Through a slot in the shear plate, a flat dowel bar  $\frac{1}{2}$  inch thick by 2 inches high and of suitable length, but usually shorter than the present standard dowel bar, fits snugly into the slot in the shear plate. This entire dowel plate is coated with paint or tar to permit movement within the slab.

Tests have shown an increase of load transfer more than three times as great as with present dowels without shattering the slab. These new Heltzel dowel bars were sheared through in destructive tests without crushing the concrete.

This improved method of doweling is claimed not to increase the cost; it uses the same number of dowels but with greater cross section and reduced lengths. The shear plates and dowels are applicable to either premoulded or poured joints or the new air-cushioned metal joints.

State Highway, York Beach, Maine. Tarvia-built in 1913—before the World War—this easy-riding, skid-safe highway is just as satisfactory for 1935 traffic as it was for the automobiles of 22 years ago.



THE BARRETT COMPANY New York Chicago Birmingham Philadelphia St. Louis Minneapolis  
Hartford Detroit Cleveland Boston Buffalo Columbus Milwaukee Providence Syracuse Lebanon Toledo Cincinnati Baltimore  
Youngstown Bethlehem Rochester Portland, Me. In Canada: THE BARRETT COMPANY, LTD., Montreal, Toronto, Winnipeg, Vancouver

For 31 years, The Barrett Company has pioneered in the low-cost road field, developing and improving materials and methods to assure the most miles of smooth, easy-riding, skid-safe road from every dollar spent. With Tarvia, you can build roads to meet immediate needs, and easily and quickly widen or strengthen them as traffic increases. There is a minimum of inconvenience to motorists and property owners, and costs are impressively low. The Tarvia field man will gladly give you the details. Phone, wire or write our nearest office.



The New 14-S Dandie Trail-Mix

### New 14-S Trailer-Mixer Narrow, Light in Weight

A new 14-S mixer of sufficient light weight for towing on two wheels, offering the contractor flexibility of equipment and permitting quick spotting for all types of concrete construction, has recently been announced by the Koehring Co., 3026 West Concordia Ave., Milwaukee, Wis., as the latest addition to the line of Koehring Dandie mixers which have been developed during the past year.

This new 14-S Dandie Trail-Mix weighs only 5,100 pounds, is 90 inches wide and has a capacity of 14 cubic feet of mixed concrete plus 10 per cent. Power is furnished by a LeRoi 4-cylinder 14-hp gasoline engine or a 10-hp electric motor. The charging skip is welded and water-tight, 66 inches wide, and 16 inches high at the closed end, with a discharge angle of 50 degrees reached in 8 seconds. A brake automatically stops and holds the skip. It is so placed that no obstruction at the front or side interferes with loading and wheelbarrows may be dumped directly into the skip.

Another feature is the Koehring automatic skip-flow shaker which causes a shaking action along the natural flow-line of the material. The shaker arm raises the complete skip structure within the slotted pivot bearings. The mixing drum is of high carbon steel, electrically-welded and water tight. The height of discharge is 32 inches from the ground and is self-locking in both discharge and non-discharge positions.

A new catalog recently issued by Koehring Co., describing in detail the features and specifications of this Trail-Mix, may be secured without obligation direct from the company.

### Republic Steel Moves Philadelphia Office

The Philadelphia District Sales Office of the Republic Steel Corp., and subsidiaries, Berger Mfg. Co. and Union Drawn Steel Co., moved on May 18 from the Fidelity-Philadelphia Trust Building to the Broad Street Station Building, 1617 Pennsylvania Blvd.

J. B. DeWolf continues in charge of the office as District Sales Manager, assisted by the present staff.

**THE NATIONAL CARBIDE V-G LIGHT**

Gives you daylight conditions on night jobs. Spreads a full, even beam of 8000 candlepower right where you need it.

Light up the job for twelve hours on one 7-pound charge of National 14-ND Carbide and 7 gallons of water. Is easily handled by one man; has nothing to get out of order; no harm done if it tips over—just stand it up again, and it goes right on working. Weight 35 lbs. empty; 98 lbs. when full.

Write for catalog on V-G Light, V-G Handy Light and Lanterns.

X-100

NATIONAL CARBIDE SALES CORP.  
LINCOLN BLDG. NEW YORK  
(Opp. Grand Central)

### Calcium Chloride in Mix Proved Effective in Test

Tests conducted by the Highway Department of the District of Columbia show that complete dissolution of the calcium chloride will take place within the mixing time and that entirely satisfactory results will be obtained by placing the dry flake calcium chloride directly in with the materials in the skip, as well as if the solution of calcium chloride were added to the mixing water or directly into the drum of the mixer.

This method is of particular importance for use on small projects where it is not practicable to require equipment designed to control mechanically the incorporation of the specified amount of calcium chloride.

In the laboratory tests conducted to determine the completeness of solution, the mixing water containing calcium chloride was filtered from the concrete after the completion of one minute of mixing in a 2½-cubic foot mixer. In

all instances, the calcium chloride concentration of the filtered solution was determined, and the results definitely revealed that complete solution of the dry flake calcium chloride had resulted.

Test on numerous control beams, made under comparative field conditions, in which calcium chloride was introduced into the mix in the dry flake as well as in solution form, showed that both methods of introducing calcium chloride provided equally high strengths.

### MacIntyre of Link-Belt Moved to Dallas

Announcement has been made by the Link-Belt Co., of Chicago, Ill., that R. Y. MacIntyre who has served as its representative in Memphis, Tenn., since 1932, has been transferred to the company's district sales office and warehouse in Dallas, Tex., where he will assist E. G. Wendell, the local manager.

### WHY?



FLEXIBLE ROAD JOINT MACHINE COMPANY

WARREN, OHIO

Why are good roads indorsed by the public? The reasons: Necessity—Efficiency—Honesty.

Last year over 30,000 lives were lost—partly because road building has not kept pace with requirements. FLEX-PLANE contraction joints control cracking and make roads safe. FLEX-PLANE screeding machines are unsurpassed for eliminating bumps.

length a  
for which  
the chief  
ran in d  
of the b  
best wou  
right up  
take up  
pile wou  
driving  
to the ha  
tively fe  
and tho  
piles wh  
weakened  
weakness.

A few  
required  
were all  
and ther  
variously  
greatly.  
visit to  
only 13  
because  
limit of  
up for 5  
24 tons.

As so  
piles we  
cut and  
of the pi  
for each  
ing of th  
might c  
before th  
The pil  
cables fr  
water ele  
boat rat

The  
barge wh  
caps we  
ing as pi  
fast to k  
making  
capping  
overhead  
ice. The  
ried a D  
and a Ge  
barge its  
depth. T  
working

The s  
3 x 10-in  
¾-inch  
it crosse  
x 24-foot  
and wer  
with galv  
¼ x 21-

The o  
sary on  
where th  
the float  
put in t  
the overl  
ried on  
approach  
yard wa  
fore the  
them.  
hammer  
erated b  
hoist.

The q  
trestle w  
piling, 1  
and 301  
for caps  
tural ste  
amounte

The c  
was Dou  
La., for  
Manager



**Dual performance**  
... NOW  
**available in GMC 1½-2 ton  
TRUCK OF VALUE!**

**Saves gas and oil, lessens wear  
and tear and assures more power,  
pick-up and speed.**

Now users of trucks in the 1½-2 ton range can get DUAL PERFORMANCE—that revolutionary truck improvement that seasoned operators everywhere have been quick to recognize as one of the few major truck refinements of the past ten years.

Already in the 2-3 ton range, the GMC Dual Performance axle has proved its ability to effect big savings in gas and oil as well as lower maintenance costs inasmuch as there is far less wear and tear on engine and other driving units. Power, too, is more

effectively utilized—the truck will climb a steeper grade, travel at faster speeds and handle bigger loads easier. All in all, Dual Performance saves money, saves time, enables the truck to do more work.

Weigh well the importance of this great GMC truck feature. Weigh, too, the importance of every one of the additional 47 cost-reducing features of the GMC 1½-2 ton truck of value, the truck that out-scores each of its chief competitors on many counts—out-scores with such important features as greater payload capacity, higher sustained torque and Lockheed hydraulic brakes with centrifuse drums and unusually large, quality brake linings.

**General Motors Trucks & Trailers**  
**1½-22 TONS**

GENERAL MOTORS TRUCK CO.

Time Payments Available Through Our Own Y. M. A. C.

PONTIAC, MICHIGAN

## Composite Pile Trestle Structure

(Continued from page 17)

length available. The shells of oysters for which this area is noted were one of the chief causes of hard driving. They ran in drifts diagonally across the line of the bridge and often one pile of a bent would drive as though in soft mud right up to the last few feet and then take up quickly while the very next pile would take up almost as soon as driving started, only to break through the hard stratum and drive easily up to the last few feet. Only a comparatively few piles were lost by breaking and those were mostly in the treated piles where the creosote oil had slightly weakened or accentuated an existing weakness in the timber.

A few piles which failed to give the required bearing at the end of driving were allowed to rest for a short time and then tested again and almost invariably the bearing had increased greatly. One pile, driven during my visit to this work, gave a bearing of only 13 tons when driving was stopped because the pile had been driven to the limit of its length. When allowed to set up for 55 minutes, it gave a bearing of 24 tons.

As soon as a bent was driven the piles were tied together by sapling ties cut and marked for the proper spacing of the piles and nailed with two spikes for each pile. This prevented any swaying of the piles in wind or tide which might cause them to get out of line before the capping crew reached them. The pile bents were straightened by cables from the tops of one bent to the water elevation of the next with steamboat ratchets in the line for pulling.

The capping crew worked from a barge which carried the material. The caps were placed as soon after the driving as possible but was not sufficiently fast to keep up with the rate of driving, making it necessary to put on a second capping crew particularly when the overhead pile driver was placed in service. The barge of the capping crew carried a Domestic portable air compressor and a General Excavator gas crane. The barge itself measured 30 x 50 x 5-foot depth. The draft was 20 inches with the working load.

The sway bracing for the bents was 3 x 10-inch creosoted timber bolted with  $\frac{3}{4}$ -inch galvanized iron bolts wherever it crossed the piles. The 12 x 14-inch x 24-foot long caps were also treated and were bolted to No. 2 and 4 piles with galvanized iron stirrups and with a  $\frac{3}{4}$  x 21-inch drift pin into each pile.

### The Overhead Pile Driver

The overhead pile driver was necessary on two sides of the swing span where there was not sufficient water for the floating equipment. The floater was put in to drive three bents and then the overhead mounted on them and carried on from that point. On the west approach the locomotive crane from the yard was run out to start the bents before the overhead driver was set up on them. A 3,000-pound Vulcan drop hammer was used on the overhead operated by a 30-hp Novo two-drum gas hoist.

### Quantities

The quantities of material for the pile trestles were 98,000 feet of untreated piling, 118,000 feet of treated piling and 301,000 feet BM of treated timber for caps, sway-bracing, etc. The structural steel for the I beams and fittings amounted to 4,280,000 pounds.

### Personnel

The contractor for the pile trestles was Doullut & Ewin of New Orleans, La., for whom T. C. Bruns was Job Manager and Engineer and H. G. Byrd,

Superintendent. E. S. Fraser was Project Engineer for the State Road Department of Florida and W. S. Gudgell was Resident Engineer-Inspector for the Public Works Administration, Project 843.

## Work on Illinois Bridge Progressing Rapidly In Spite of High Water

Work on the new \$100,000 bridge across Rock River near Prophetstown, Ill., is progressing rapidly, since the river has lowered to normal stage. The south abutment in Prophetstown township and two of the four piers have been completed and work has been started on the north abutment in Lyndon township.

The Clinton Engineering Co., which has the contract to build the abutments, piers and cement floor of the bridge, started work last November but was delayed several times by high water. In-

dications are now that the bridge will be completed August 1, according to a special story in the Davenport, Iowa, *Daily Times*.

When completed the bridge, which is being constructed by the State of Illinois, will be approximately 480 feet long, with a 24-foot roadway. The Clinton Bridge & Iron Works has the contract for the steel work, which will be started shortly.

The old bridge, erected in 1893, has been in bad repair for the past six or eight years, and the heavy traffic necessitated a stronger span. Following the opening of the new structure, the old bridge will be junked.

## Sullivan Moves Offices

Sullivan Machinery Co. of Chicago, Ill., has announced that its general offices have been moved from the Wrigley Building at 400 North Michigan Avenue to the Bell Building, 307 North Michigan Avenue.

**LANSING**  
COMPANY  
LANSING, MICHIGAN

CHICAGO BOSTON NEW YORK PHILADELPHIA  
KANSAS CITY MINNEAPOLIS  
SAN FRANCISCO

# CLETRACS MOVE 15% MORE DIRT

GASOLINE  
AND DIESEL  
POWERED  
TRACTORS  
FROM 22 TO  
80 HORSE-  
POWER

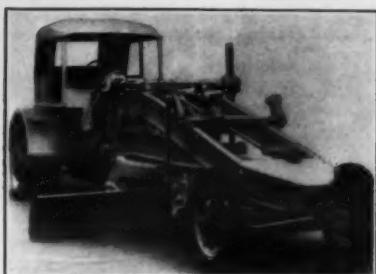
**A** WEST COAST CONTRACTOR\*, operating a fleet of crawler tractors, of which five are Cletrac "Eighties," says, "In 18,000 hours of operation my Cletracs and self-loading equipment have consistently moved 15% more dirt than any of my other equipment in the same power class." Owners everywhere are operating Cletracs with similar results. Let your Cletrac dealer show you why Cletracs are breaking performance records.

THE CLEVELAND TRACTOR CO., Cleveland, O.

\*Name on request

Cletracs  
operating  
12 yard  
self-loading  
equipment

**CLETRAC CRAWLER TRACTORS**



The New Waco Road Hog

### Rear-Controlled Grader Has Modernized Design

Termed "the Grader of Tomorrow," by the manufacturer, the new Model 35 Road Hog grader recently announced by the W. A. Riddell Co., Bucyrus, Ohio is entirely new in design and construction. It is made in two sizes, so constructed that all standard types of tractors may be used.

Frames for 40 to 50-hp tractors are 10 inches high, weighing 30 pounds per foot, while for lighter power a 10-inch frame weighing 25½ pounds per foot is used. The frame is a welded rigid frame with five cross braces of tubular and box section construction, all connections being hardened ball joints with machined adjustable bearings.

One of the features is the two-speed variable control power lift, giving fast movement to the blade, cross shaft, circle turning and scarifier at a normal rpm of the motor or at low throttle. This new power control assembly is grease tight, with drop forged, machined and hardened gears and clutches, operating on ground, splined shafts with replaceable bronze bushings and patented oil seals. Another feature is the pivoted spring suspended front end whereby any tension may be put upon the spring, eliminating chatter and side whip in high-speed maintenance work.

The size of the circle has been increased over that of previous Road Hog models to 61½ inches, with adjustable take-up to eliminate chatter. Moldboard connections to beams are ball and socket construction.

### Missouri Distributor Moves

Tulley Equipment Co. recently moved its quarters to Webster Groves, Mo., on U. S. Route 66. Its address is R. F. D. Route 6, Box 124, Webster Groves, Mo.

## AMERICAN

### GOPHER SHOVEL

The 1 Yard Model 400  
"ON THE JOB"

BACK in 1905, we built the American Ditcher Shovel, the first shovel type machine made. Today, American Gopher Shovels are a complete line of successful shovels, built in sizes  $\frac{1}{2}$  yd.,  $\frac{3}{4}$  yd., 1 yd.,  $1\frac{1}{2}$  yd.,  $1\frac{1}{4}$  yd. and 2 yd. dragline.

Send for new roto publication, "American Gopher Shovels" Illustrated, showing action pictures "on the job".

**AMERICAN HOIST & DERRICK COMPANY**  
ST. PAUL, MINNESOTA

### Test Piles Proved Value on Louisiana Bridge

Spending money to save it may seem like a paradox, but it was done to good advantage by the Louisiana Highway Commission on the Bonnet Carré spillway highway bridge, 30 miles north of New Orleans, constructed last year by the Keliher Construction Co., of Dallas, Texas.

A part of the contract was the driving and loading of 48 concrete test piles, for which the Commission paid \$400 each for the casting and driving and an additional \$120 each for the loading of these piles. The information obtained determined not only the length of the permanent piles to be used, but also the number of piles per bent and the length of the spans.

That a total expenditure of approximately \$25,000 for these test piles was justified is proved by the fact that the length of the permanent piles actually driven in the bridge resulted in a saving of more than \$60,000 over the estimated

length shown before the test piles were driven and loaded.

A complete description of the casting and driving of the 75,450 feet of con-

crete piles required for this bridge structure appeared in the April issue of CONTRACTORS AND ENGINEERS MONTHLY on page 2.

## PORTABLE ASPHALT PLANTS TOWER TYPE

### LARGE CAPACITIES HOT OR COLD MIX

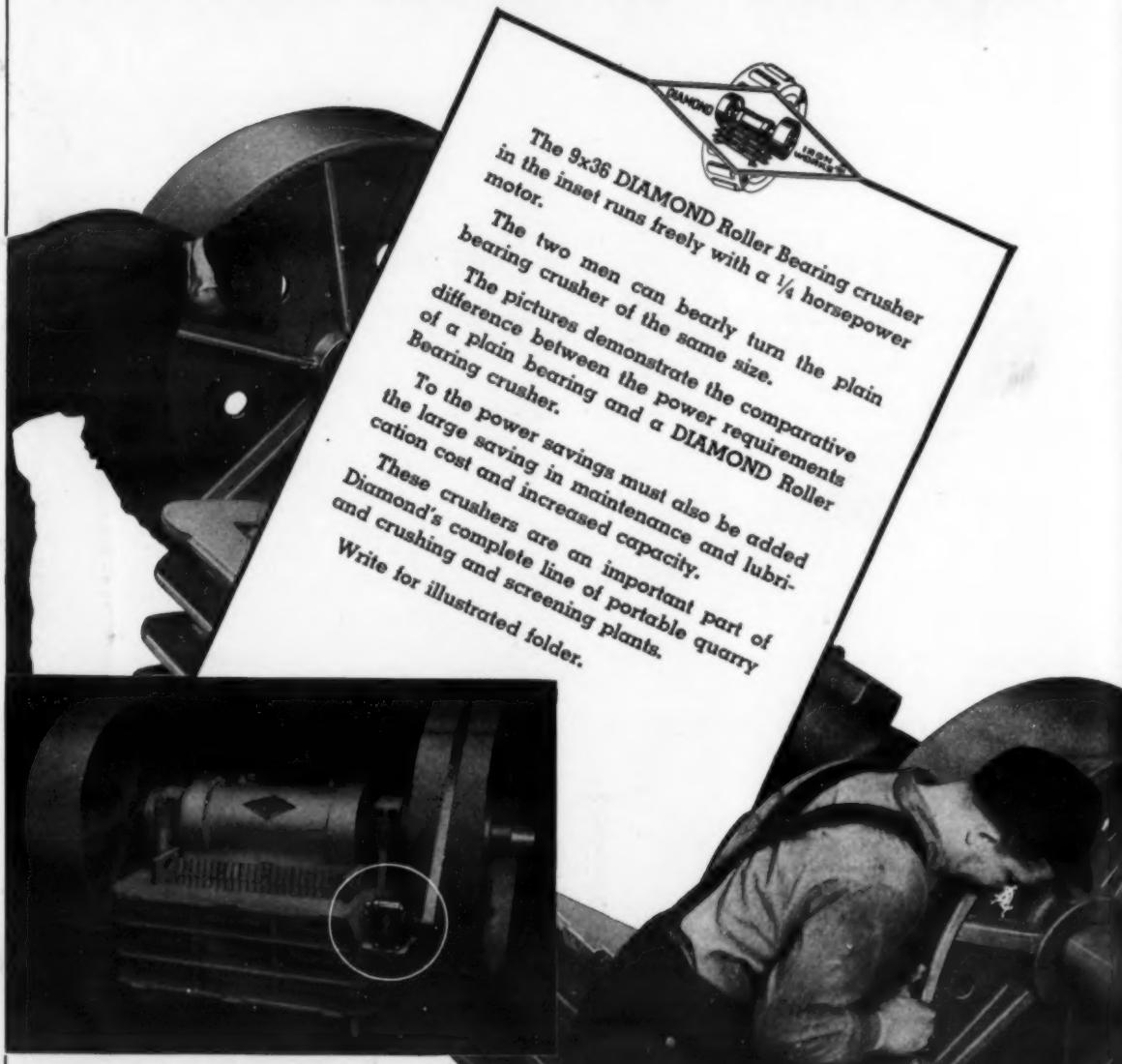
Accurate control of materials to comply with any standard specifications for bituminous mixtures.

Send for Bulletin T-248

**ETHERINGTON AND BERNER INC**

Indianapolis, Indiana

## WHY DIAMOND BUILDS ROLLER BEARING CRUSHERS



9x36 Roller Bearing Crusher

ESTABLISHED-1880

**Diamond Iron Works, Inc.**  
MINNEAPOLIS, MINN. U.S.A.

## Relief Employment Hits Skilled Labor

(Continued from page 20)

### Bid Prices Increased

The mean level of prices for earth excavation in Illinois has increased from 17 cents in 1932 to 26 cents in 1934. On one National Recovery job at the January 4, 1935, letting in Illinois, 300,000 cubic yards of earth excavation was awarded at 34 cents, and the job possessed no apparent bad features other than the fact that the selection of labor from an employment agency was mandatory.

There is not a contractor today, regardless of experience, and with unlimited cost data at his disposal, who can intelligently estimate the cost of highway work in a locality with which he is not intimately familiar. Man-hours in 1934 were as elusive as so many fairies.

If we disregard the hours which a so-called skilled laborer works during the period when he is being tried out, found wanting and then discharged, the actual man-hours per 1,000 yards of excavation, per ton of steel erected or per mile of pavement laid, has not been increased. Thus, the use of relief labor has failed as a means of production and the local employment agency should be discarded. If this method of hiring labor is not discarded, what is to become of the trained man?

The contractor has trained his organization and feels a moral obligation to it which he does not want to overlook. If national recovery is to be an accomplished fact, then ability and integrity must be recognized and conscientious effort and skill built upon a foundation of experience must necessarily be rewarded. The contractor wants, yes, demands, permission to assist efficient, trustworthy, dependable highway laborers to establish themselves permanently with a real outlook on the future. Thus established, the laborer is an asset to any community and is better able to provide for his less fortunate associates. This is preferable to inefficiency, delays and the general unsatisfactory conditions which result from the placing of laggards and dregs of the industry in his place.

### Compensation Risks Bad

Accidents, insurance and the safety of employees must not be overlooked in considering this question. Comparing the number of accidents per thousand man-hours with 1931 and 1932 figures, it is evident that something is wrong. Accidents are so numerous that, even

with the increase in hourly wage rates, which correspondingly increases the compensation premium, the insurance companies are very reluctant to take on any new compensation risks. This condition exists even after the manual rates have been increased from 15 to 20 per cent. Compensation insurance is being canceled repeatedly over the entire nation due to bad experience records laid squarely at the door of unadapted workmen. The history of thousands of accidents show the definite results of ignorance, carelessness and inability.

### The Solution

The whole labor schedule should be revised. The contractor must be freed from the mandatory selection of labor, particularly skilled labor, from employment agencies. Give the trained man his rightful place in the scheme of things. The unadapted have no place in the construction industry, and to exclude the competent is only to continue the confusion and chaos out of which we are so earnestly striving to emerge.

This is the basic principle on which the construction industry's portion of the recovery program must be built. The competent employee, properly coordinated in the organization, is the foundation on which the industry has been developed. He is the backbone of construction and is rightfully entitled to recognition.

*From a paper presented before the Highway Contractors' Division, A.R.B.A.*

### Effect of Calcium Chloride on Cements and Concretes

A report of the Bureau of Standards investigation on the "Effects of Calcium Chloride on Portland Cements and Concretes" was delivered by Paul Rapp before the recent meeting of the Highway Research Board. This report, covering a two-year study under a fellowship of the U. S. Bureau of Standards, shows that calcium chloride used as an admixture accelerates the early strength, which

is of great importance in out-of-season concreting. Increase in the one-year strength and greater workability of the mortar, permitting a reduction of mixing water with resulting increase in density and strength, are also reported.

Reprints of this report are available gratis to contractors and engineers by writing to the Calcium Chloride Association, Penobscot Bldg., Detroit, Mich., and mentioning this magazine.

**Oshkosh**  
**Folding Barricade**  
Has adjustable jaw which takes any thickness of cross rail from 1" to 3"—no shimming—convenient extension swivel—handy flag socket—strong, light and compact—folds flat—competitively priced. *Write for Information*  
**LEACH COMPANY**  
412 S. Main St. Oshkosh, Wis.

## Reduce Road-Building Costs with I-R Auto-Feed Wagon Drills

- ✓ They provide a fast method of handling the most powerful I-R drills with less effort on the part of the operator.
- ✓ The Auto-Feed holds the drill down to its work at all times and gives better control in rocky ground.
- ✓ The Auto-Feed is entirely automatic. It requires no air or other power and operates equally well in any position.
- ✓ The Auto-Feed is sturdy, compact and free of external moving parts. It permits safe, automatic operation and is of proven, durable construction.



- ✓ Auto-Feed Drills throughout the country are establishing new low records of upkeep costs.
- ✓ Wagon mountings reduce set-up time. Time spent in changing steel can be cut in half or less.
- ✓ Convenient adjustments of the flexible mounting provides for holes in any place, at any angle. Twenty-foot steels are readily handled.
- ✓ Ingersoll-Rand, the oldest of rock drill makers, has a complete line of economical drilling equipment for road-building jobs.

Branches or Distributors in Principal Cities the World Over.

174-5

**Ingersoll-Rand**  
11 BROADWAY, NEW YORK, N.Y.

### MORE YARDAGE per day



Give the Williams "Champion" the job of boosting your profit—hook 'em to your crane now.

The Williams "Champion"  
Williams digging demands also include  
Multiple-Rope and Dragline Buckets.  
Write for bulletins.

THE WELLMAN ENGINEERING CO.  
7012 Central Ave., Cleveland, Ohio

**WILLIAMS**  
BUCKETS



## Dredge Manatee Delivers the Goods

(Continued from page 18)

Westinghouse motor supplies water under pressure to the main pump stuffing boxes and to the cutter head bearings to keep sand washed out. This pump delivers water up to 100 pounds pressure and is used as a fire pump if needed.

A 4-inch single-stage Morris centrifugal pump driven by a 15-hp Westinghouse motor supplies the cooling water for both the engines. A 2-inch Viking gear pump is used to handle the lubricating and cooling oil to the main 1,000-hp engine and a Hydroil centrifuge is used to clean the oil of both engines. An Ingersoll-Rand 2-stage air compressor driven by a Westinghouse 20-hp motor furnishes air to start the engines in case the starting air is lost from the tanks usually supplied by the compressors mounted on the engines. An air lift siphon is used to pump the bilge.

The four large fuel compartments of 8,000 gallons each, located near each corner, can be used to trim the hull "to a whisker." A 2-inch Roper gear pump connected with a unique manifold is used as a transfer pump and can handle fuel oil in or out of any of the fuel compartments, overboard or inboard.

### Lights for Night Work

Two Crouse-Hinds 500-watt floodlights are mounted forward and two more aft to illuminate the area being dredged and the spuds and the pontoon line.

The lighting system is operated at 220 volts. This, together with the slight vibration on the dredge due to the operation of the two diesel engines, at first caused a considerable amount of trouble from broken filaments in the electric light lamps. This difficulty was overcome by using "rough service" lamps for the house and deck lighting, and by connecting two pairs of floodlights in series so that 110-volt lamps could be used in these larger sizes. As the "rough service" lamps are available only in 50-watt size, two of these are used with a double socket wherever more light is required in the engine room than is furnished by a 50-watt lamp.

### The Crew

The operating crew for the dredge was as follows for each shift on the highway fill contract between Chef Monteur and Rigolets Bridges: one operator, one tug boat captain, one deck mate who moved the anchors and cared for the pontoon line, two able-bodied deck hands, one shift engineer and one oiler.

### Restoring Worn Parts With Welding Electrode

The restoration of worn teeth, lips and bottoms of power shovels, lugs and treads of tractors, housings and impellers of pumps, rock crushing equipment and gear and pinion teeth is possible with a new hard surfacing electrode recently announced by the Lincoln Electric Co., Cleveland, Ohio.

This Abrasoweld electrode provides a deposit of abrasion-resisting alloy of the self-hardening type which surface-hardens very rapidly under conditions of impact and abrasion. Unlike other electrodes, the Abrasoweld deposit develops its maximum hardness only at the surface where it is cold worked, leaving a strong tough core for resisting shock. Weld metal thus produced must be ground to shape as it can not be filed or machined. This new electrode is made in  $\frac{1}{8}$ -inch size, 14 inches in length and is used with reversed polarity with a current range of 125-200 amperes and 24-27 arc volts.



The New Adnun Black-Top Paver

### Black-Top Paver Features Cutter Bar, Power Cut-Off

A new and improved black-top paver, which will handle any mix, hot or cold, and lays any width or thickness, has recently been announced by the Foote Co., of Nunda, N. Y.

The features of this new Adnun paver are a two-speed cutter bar and a power cut-off. With the cutter bar, which consists of a moving blade much like that of a mower, the speed may be adjusted to give the best results in accordance with the density of the mix. The teeth are beveled on the under side, to give a crowding action against the material and exerting an initial compression that compacts the material in holes. Two operating speeds make it possible to meet the varying conditions of mix.

The power cut-off is a positive closing door that shuts off the flow of the mix to the subgrade, giving the operator absolute control of the laying of the pavement at any time from the control platform. With this power cut-off, the operator can continue operation up to intersections involving a change in grade, shut off the mix while crossing the intersection and then continue on the other side.

Controls are grouped for easy handling where the operator can follow the edge of the course. A new roller lubrication device is provided to prevent material from adhering to the rollers and scrapers also keep the rollers clean. Power is applied to both front wheels and rear rollers and there are three speeds, forward and reverse.

Copies of a new catalog describing this 1935 model Adnun black-top paver may be secured free direct from the Foote Co.

### Tests on Concrete and Concrete Aggregates

A report on the significance of tests of concrete and concrete aggregates, sponsored by the A.S.T.M. Committee C-9 on Concrete and Concrete Aggregates, has recently been issued by the American Society for Testing Materials. This publication was prepared to present a clear statement of the significance of the various tests applied to these materials.

Ten sections are devoted to concrete tests and six to aggregates. The former include: compressive strength, tensile and flexural strengths, shearing and torsional strengths, elastic properties, durability, abrasion, workability, volume

### SAUERMAN LONG RANGE MACHINES



for Digging in the Dry or Under Water

Reach as far as  
1500 ft.

Dig Deep;  
Dump High.

Capacities from  
100 to 5,000 cu.  
yd. a day.

Low in Cost

Write for Catalog.

**SAUERMAN BROS., Inc.**  
464 S. Clinton St.  
CHICAGO . . .

changes, cement content, and uniformity. Under aggregates the following are evaluated: gradation, specific gravity, unit weight and voids, soundness, abrasion, free moisture and absorption, deleterious substances, and mortar strength tests. A section discusses the numbers

of specimens or tests required for reasonable accuracy of the average.

Copies of this 123-page report, in heavy paper cover, may be obtained at \$1.25 a copy from the American Society for Testing Materials, 260 So. Broad St., Philadelphia, Pa.

"IT PAYS  
TO BE  
**DIESEL-  
WISE"**



Three of the CUMMINS Diesel-powered trucks with 16-yard dump bodies, operated since 1923 by Cilco Terminal Co., Bridgeport, Conn. Reports operating costs 50% below gasoline-powered units. "In the matter of power, they were the only truck that could wade through the snowdrifts."

## CUMMINS DIESEL ENGINES for

### Trucks — Shovels — Crushers — Compressors — Pumps — Drills, etc.

CUMMINS engineering advancements give you Diesel power at its best! Amazing fuel economy — highest power efficiency — enduring dependability. Easily installed to replace gasoline engines. PROVED PERFORMANCE — in heavy-duty truck service alone, CUMMINS Diesels are running over 3,000,000 miles a month. Ask for complete facts.

**CUMMINS ENGINE CO.**

**COLUMBUS, IND.**

—The Leader in Diesel Engineering Advancement  
SALES AND SERVICE FROM COAST TO COAST

THE MOST POPULAR ROLLER IN THE UNITED STATES IS THE **BUFFALO-SPRINGFIELD**

**SIZES 2½ to 17 TONS**

**BUFFALO-SPRINGFIELD ROLLER CO.**  
Springfield, Ohio

**THE REASON IS NOT HARD TO FIND (IF YOU HAVE ANY DIFFICULTY, WRITE FOR OUR BOOKLET AND ALL WILL BE "CLEAR AS CRYSTAL")**

## Lubrication Queries

Is some lubrication problem bothering you? Tell us about it and we shall be glad to help you.

### Question

*What is the proper way of lubricating vibrating screens which operate at a high speed?*—Wausau, Wis.

### Answer

Due to the severe duty on the bearings of high-speed vibrating screens, there is always some tendency to run warm even when the bearings are properly lubricated. This heating necessitates the use of a grease which will not separate because of the heat nor because of the churning of the lubricant by the rollers. With each screen sent out by manufacturers of this type of equipment, they include an instruction sheet warning against the use of improper grease. One that we have seen lists a number of widely known quality brands of grease which have been found to work satisfactorily. This manufacturer has told us that in spite of the printed instructions which he furnishes, a great many oil and grease salesmen insist on selling the customer a grease from which the oil separates and runs out as soon as the grease becomes warm. In a short time the bearing becomes filled with the grease filler, sometimes to such an extent that the bearing seizes.

There we have a dual problem. How can we control the lubricant salesman who may be working merely for commission and hence is very desirous of selling *some* lubricant. We can only repeat the warning we have given so many times capped with a slightly different outlook. Buy your lubricants from a recognized refiner or distributor with a reputation for quality. Such an organization will employ as salesmen only those individuals who have a background and training in lubrication engineering. They will not merely try to sell you "some grease" but rather will advise you intelligently on the proper lubricant to use.

### Link-Belt Moves Warehouse in Portland, Ore.

In order to serve the growing needs of local industries, the Link-Belt Co., of Chicago, Ill., has recently moved its Portland, Ore., warehouse from the congested business district on Front Avenue, where it has been located for about twenty years, to the corner of 14th Avenue & Savier Street. The new warehouse, with 10,000 square feet of floor space, is close to the freight sheds, the docks on the water front, and the main highway along the Willamette River and provides facilities for carrying a very complete line of conveying and power transmitting machinery, and for making shipments by rail or trucks.

The company's sales office will also be located at the new address, 1637 N. W. 14th Avenue. D. L. Shirley is Resident Manager.

## COMPLETE CUTTING AND WELDING APPARATUS

for all types of light and heavy work. Torches, tips regulators, hose, goggles, gloves, lighters and wrenches. Low prices—highest quality materials and workmanship.

Write for catalog

The Alexander Milburn Co.  
1409 W. Baltimore St. . . . . Baltimore, Md.

## 24-Hour-Old Concrete Piers Withstand Force of Ice Jams

The early strength of calcium chloride integrally-cured concrete was demonstrated last winter at Lock Haven, Pa., dam when 24-hour-old concrete piers effectively withstood the enormous force of ice jams carried by flood waters.

The concrete for the dam was poured the previous day at a temperature of 38 degrees F. and the forms were removed the following morning. In the afternoon the river started to rise and by 8 o'clock in the evening the coffer-dam had been washed away.

The new dam, which is of the Amerson gravity type, was subjected to the impact from a 16-inch thickness of ice which snapped off 12-inch power line poles and bent extruding reinforcing bars in its course of destruction.

Examination of the concrete after the water had subsided showed that no damage whatever to the concrete had resulted.



Oil Bath Type

Truck users include  
MACK  
WHITE  
STEWART  
AUTO CAR  
F. W. D.  
WALTER  
BROCKWAY  
KENWORTH  
CORBITT  
and on all types  
of industrial  
and construction  
equipment

NON-CLOGGING NON-RESTRICTIVE

**AIR-MAZE**  
AIR FILTERS FOR EVERY INDUSTRIAL PURPOSE

### See the Difference!

Look inside the air filter you are using—and then look inside an Air-Maze. What a difference! For the Air-Maze does not build up, clog or have restricted areas, to cause uneven air flow and loss of power. A clogged filter can reduce gasoline mileage as much as 20%. But the patented and exclusive Air-Maze construction assures an exact, uniform density at all times.

**SPECIFY AIR-MAZE** when ordering new equipment and get those important "plus" features that are only to be had with the genuine Air-Maze.

AIR-MAZE CORPORATION • 812 HURON ROAD, CLEVELAND, OHIO



The best proof of their quality  
is the money they save you in  
**HAULAGE COSTS**



Put Chevrolet six-cylinder trucks on the job and you can be sure you will get low operating costs! Chevrolet quality manufacture stands squarely behind this statement of fact. Examine a Chevrolet truck—from husky rear axle to efficient cooling system—and you will find quality materials and precision construction in every part.

Compare Chevrolet's low delivered prices and easy G. M. A. C. terms. A General Motors Value

The result is vital savings for you—fuel savings from the famous Blue-Flame valve-in-head truck engine, and maintenance savings from the rugged chassis. You have every reason to register more payload hours—and more profitable payload hours—when Chevrolet trucks go to work for you!

CHEVROLET MOTOR CO., DETROIT, MICH.

## WORLD'S LOWEST-PRICED TRUCKS

# CHEVROLET TRUCKS

FREE! Mail coupon for  
"OWNER'S SIMPLIFIED OPERATING RECORD"

Chevrolet Motor Company (Dept. 20A)  
Detroit, Michigan

Gentlemen: Without obligation on my part, send me the "Owner's Simplified Operating Record" booklet which enables truck owners to learn operating costs quickly and accurately.

Name and title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_



**"Now I know why so many  
C O N T R A C T O R S  
are changing to FORDS"**

"I READ that Ford dealers were inviting responsible truck owners to make their own tests of the 1935 Ford V-8 Trucks and Commercial Cars. I called a Ford dealer and asked for an 'on-the-job' test . . . with my own loads, over my own routes . . . and now I know why so many operators are changing to Fords.

"It didn't take me long to discover that I've been 'spotting' my competitors who use Ford V-8's too many important advantages. In the first place, I've been trying to buck V-8 Performance. In the second place, I've been up against V-8 Economy. And in the

third place, while I've been footing big repair bills, they have been enjoying V-8 Reliability and the advantages of Ford's Low-cost Engine Exchange Plan and other parts exchange privileges.

"That 'on-the-job' test showed me how to save TIME and save MONEY. I'm not spotting ANYbody ANYthing any more.

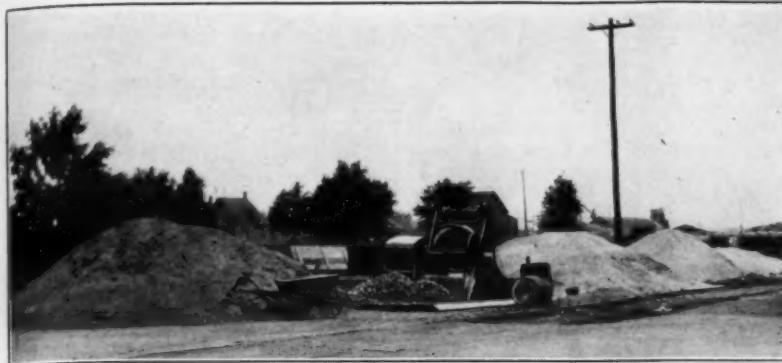
"And if you are competing with V-8 owners too . . . take my advice and quit trying to BUCK them. Change over to Fords . . . like I did . . . and give them, and all the rest of your competitors, a run for their money!"



**FORD V-8**

**TRUCKS AND  
COMMERCIAL CARS**

AMERICAN  
DERRICK



Preparing Patching Material by Mixing Tarvia-KP and Aggregate in a Small Concrete Mixer

### Bituminous Patching for Streets and Roads

Patching holes in all kinds of pavements may be done with Tarvia-KP, a product of the Barrett Co., 40 Rector Street, New York City, which is manufactured to meet rigid specifications for a cold-patch material.

Holes to be patched must be cleaned so as to remove all dust, dirt and loose material and the sloping edges of the hole must be cut so that the sides will stand vertically. This preparation is most important, whether cold or hot patching material is to be used.

No hard and fast rules for proportioning the ingredients of the mix can be given, but in general a soft stone, such as limestone, requires more Tarvia than a hard stone like trap rock. Sufficient Tarvia-KP must be used to coat thoroughly all of the aggregate but not sufficient to run off the stone when the mix is placed in piles.

Aggregate should be clean and dry when mixed. Mixing can be done by turning the aggregate and Tarvia with shovels by hand. The aggregate should be placed on a mixing board and the proper amount of Tarvia-KP poured over it in one or two applications. The mixture should be turned two or three times.

Better work can be done by the use of a mechanical mixer. Any ordinary concrete mixer is satisfactory. Aggregate, Tarvia-KP and fine aggregate should be placed in the mixer in the order named, and mixing should continue until all of the aggregate has been coated, usually requiring about two minutes. The mix may be used immediately although it will be somewhat

tougher if permitted to cure in a pile for a few days.

The mix should be placed in the hole using sufficient to slightly more than fill the hole. The patch should be well consolidated by tamping or rolling. If the road being patched is to be surface treated, it is not necessary to seal the patches. Otherwise, all but the most

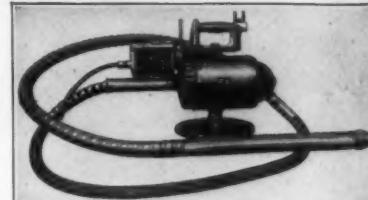
temporary patches should be sealed.

Complete instructions for the use of Tarvia-KP, as well as for Tarvia and Tarvia-Lithic for the maintenance of bituminous, brick, concrete, gravel and other pavements, are contained in a new road maintenance book which is available free to interested contractors and engineers by writing direct to the Barrett Co. or to this magazine.

### Two New Distributors for Hyppressure Jenny

Homestead Valve Manufacturing Co., of Coraopolis, Pa., has announced the appointment of the W. T. Walsh Equipment Co., 3088 West 106th Street, Cleveland, Ohio, and Alban Tractor Co., 725 East 25th Street, Baltimore, Md., as exclusive distributors for its spray cleaning unit Hyppressure Jenny.

## REDUCE YOUR SPADING COSTS!



**MALL TOOL COMPANY**

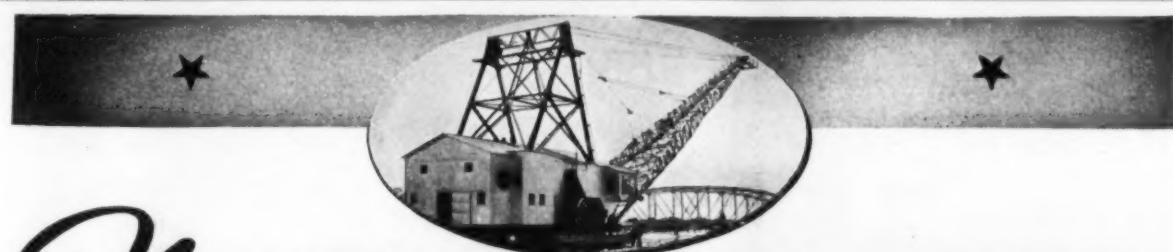
### USE MALL CONCRETE VIBRATORS

FOR economical compaction of low slump concrete on every type of concrete structure.

Illustrated: Mall 3 hp. heavy duty electric machine with 2½" vibrator. Furnished with 14 ft., 21 ft., or 28 ft. of flexible shafting. Attachments for grinding and rubbing.

Portable gas engine units for use on jobs where power is not available. Bulletins on request.

7743 South Chicago Avenue  
CHICAGO, ILLINOIS



## Now YOU CAN LUBRICATE SHOVELS WITH Alemite Powerguns

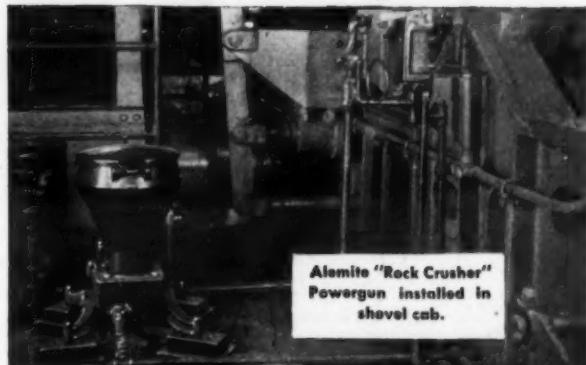
**Stationary Installation Permits Piping of Lubricant Under Pressure Throughout Machine—Provides Convenient Outlets at Necessary Points—Eliminates Constant Refilling of Hand Guns**

HERE'S the most amazing and revolutionary power-shovel lubrication development in history—a simple, labor-saving method of cutting lubrication costs to an absolute minimum and for making sure that every bearing gets adequate and positive attention. It eliminates the handling and carrying of lubricant containers and the constant refilling of hand guns and puts tons of pressure at the operator's command—insures a better, more complete job and makes the job easier.

### What It Is and Does

Installation of an Alemite Powergun is simplicity itself, thereby making it available for use on shovels now in operation or on new equipment. The gun (either air- or electrically-operated) is mounted in a stationary position in the shovel cab and connected to piping that extends throughout the machine. Shut-off valves are located at convenient points (usually two outside the cab and two inside), and provision made for connecting hose quickly. After connection is made and shut-off valve opened, operator measures and regulates lubricant flow by means of a hand-control valve on the hose.

Alemite Powerguns are available in a range of sizes that make them applicable to any job. They will handle grease of all types and will deliver it from original containers or from gun reservoir as the case demands. Get complete information on this money-saving, labor-saving, lubricant-saving equipment today. Send the attached coupon now. There's no obligation.



Alemite "Rock Crusher" Powergun installed in shovel cab.



Lubricant piped under pressure to convenient outlets simplifies servicing of all bearings.

ALEMITE CORPORATION (Div. of Stewart-Warner Corp.) Dept. F  
1850 Diversey Parkway, Chicago, Illinois

Please send me complete information on the lubrication of Power Shovels with Alemite Powerguns.

Name \_\_\_\_\_

Address \_\_\_\_\_

Firm Name \_\_\_\_\_

State \_\_\_\_\_

**AMERICAN GOPHER SHOVEL**  
The 1½ Yard Model 450  
"ON THE JOB"

We invite you to send for our new, interesting Free rotogravure magazine "American Gopher Shovels" Illustrated.

Write to AMERICAN GOPHER SHOVEL CO., SAINT PAUL, MINNESOTA

**AMERICAN HOIST & DERRICK COMPANY**  
SAINT PAUL, MINNESOTA

**ALEMITE**  
Controlled Application of the Correct Lubricant

## Perini Elected President of N. E. Road Builders

At the annual meeting of the New England Road Builders Association this spring, Louis R. Perini, President of B. Perini & Sons, Inc., one of the largest and most active road paving companies in New England, was elected President of the Association.

Other officers elected were C. Joseph

Maney, Cambridge, Mass., Vice President; Joseph A. Tomasello, of Boston, Treasurer; David A. Bridge, Hazardville, Conn.; Carlo Bianchi, Framingham, Mass.; James A. Knowlton, Belmont, Mass.; Abner P. Lawton, of Providence; E. Raymond Newell, of Uxbridge, Mass.; D. W. Overocker, Burlington, Vt.; James F. Powers, of Brockton, Mass.; Ovid F. Winslow, Nashua, N. H., Directors. Frederick Hoitt was re-appointed Secretary.

## New Officers for White Co.

At a recent organization meeting of the directors of the White Motor Co., Cleveland, Ohio, R. F. Black was elected President of the company to succeed A. G. Bean, who was elected Chairman of the Board. Because of his health, Mr. Bean desired to be relieved of active duties as President, though he will remain in charge of the company's affairs.

Until his election, Mr. Black was President of the Brockway Motor Truck Corp. and previously had been Vice President of the Mack-International Motor Truck Corp.

Executives who were re-elected were: T. R. Dahl, Executive Vice President and Secretary; George H. Kelly, Vice President and Treasurer; G. F. Russell, Vice President in charge of sales; H. K. Tork, Vice President, Public Works Division, and S. G. Crilly, Comptroller.

## ASPHALT FOR PAVING... ASPHALT FOR P

### "LET'S MAKE THE MOST OF THIS MONEY!"

*"An economical road or street paving project is easier to sell because it's a better buy for the community. Properly planned paving jobs make a fine and lasting visible record for public official and contractor alike. Have you considered your year's work from this standpoint, of its recommendation of your ability in the future?"*



**T**HREE are two phases of economy in every paving job: first, the immediate cost of materials and labor; and second, the average of this original investment, plus maintenance, over a period of years.

Asphalt wins on both accounts, because the installation investment can be controlled to fit requirements. For heavy traffic, for moderate traffic, for light traffic; the expense of paving with asphalt is adjustable to actual demands. And maintenance costs are low when the job is well done.

The wide range of Stanolind asphalts makes intelligent selection and exact specifications possible. Write or call your nearest Standard Oil (Ind.) office for full information on these materials.

Copr. 1935, Standard Oil Co.

**ASPHALT** for every Purpose

Stable  
for B

verts, its  
flow of flo  
nel or op  
water wou  
in rushing  
completely  
and impede

Not kno  
which wo  
for the t  
contractor  
each 50 f  
to refusal  
and the  
was told w  
for the t  
piles only  
was not  
guess as  
to order.

The rel  
panels w  
bent carri  
I beams.  
over the r  
for the w  
foot gunw  
the 2,400  
end and  
powered  
other. Th  
levered o  
beyond th  
quired. T  
taching to

Item  
Clearing  
Grubbing  
Dismantle  
Excavat  
Excavat  
Overhaul  
Class A concre  
Class AA concre  
Reinforcing st  
Timber piling  
Untreated tim  
Cocoated str  
\*1,000 feet o  
\*12.5 mix  
\*12.5 mix  
\*\*The test  
\$175.00 easi

Roadway ...  
Repair and re  
New bridge (

Other miscell

Total contrac

L

The w  
20 hours  
to have  
crews po  
working  
It was fo  
labor 5 h  
days a w  
There w  
way in th  
tendency

The m  
labor wa  
the skille  
ages of i  
tively. D  
was an a

NYB - L

SHEET  
JACKSON

## Stable Clay Fill for Bridge Approach

(Continued from page 15)

verts, its large area permitting ready flow of flood waters. If the relief channel or opening were not provided, the water would top the embankment and in rushing over would wash it out, completely destroying the investment and impeding traffic for a long period.

Not knowing exactly the penetration which would be required for the piles for the trestle, the state ordered the contractor to purchase three test piles each 50 feet long which were driven to refusal. After this was completed and the piles loaded, the contractor was told what lengths of piles to order for the trestle. He was paid for the piles only to the cut-off line so that he was not penalized by hazarding a guess as to the proper length of pile to order.

The relief opening has forty 20-foot panels with five creosoted piles per bent carrying a concrete deck on steel I beams. The roadway is 24 feet wide over the relief opening. The pile driver for the work had 50-foot leads and 65-foot gunwales carrying the leads, with the 2,400-pound drop hammer at one end and the Mead-Morrison hoist powered by a Hercules engine at the other. Thus the leads could be cantilevered out over the end of the fill or beyond the last bent the 20 feet required. The outfit was moved by attaching to a deadman or trees ahead and pulling itself forward by the hoist.

### Quantities and Unit Prices

Item	Quantity	Unit Price
Charring	12.65 acres	\$40.00
Grubbing	5.53 acres	60.00
Drainage excavation	7,318 cubic yards	.28
Borrow excavation	77,475 cubic yards	.28
Overhaul	2,420,000 station yards*	.0025
Class A concrete	246.92 cubic yards**	21.00
Class AA concrete	414.65 cubic yards***	21.00
Reinforcing steel	116,000 pounds	.0475
Timber piling	8,900 linear feet****	.88
Untreated timber	57,000 feet BM	70.00
Creosoted struct. timber	12,000 feet BM	87.50
1,000 feet of free haul		
*12 ft mix		
**12 ft mix		
****The test piles driven and loaded were paid for at \$175.00 each.		
Total Contract Prices		
Roadway	.....	\$31,156.72
Repair and reconstruction of bridge	.....	6,388.00
New bridge (relief opening trestle)	.....	40,059.34
Other miscellaneous items	.....	87.26
Total contract prices, not including extras	.....	\$77,693.32

### Labor, Hours and Pay

The work on this project was pushed 20 hours per day, making it necessary to have two crews per day and four crews per week of unskilled labor, working each their 30 hours per week. It was found better to use the skilled labor 5 hours per day for the full 6 days a week so as to hold it on the job. There was other construction underway in the vicinity and all labor has a tendency to drift.

The minimum pay of the unskilled labor was 30 cents per hour and for the skilled labor 50 cents, with averages of 35 cents and 65 cents respectively. During the month of July there was an average of 108 skilled and un-

skilled men on the job with a weekly payroll of \$1,265.70. This was before the trestle construction was started.

### Personnel

This project NRH 217A, State 1905-A-U-1, was awarded to Robinson & Young of Baton Rouge, La., for the sum given above. E. R. "Ned" Morris was Superintendent for the contractor and Theo. T. Chenet was Resident Engineer for the Louisiana Highway Commission.

### Crown Important Factor in Stabilized Roads

The methods employed and the machinery required in the construction of stabilized roads are flexible and subject to the approval of the engineer in charge. Mixing may be accomplished either by mixing in place by blades or discs or by a machine-mixed method at the material site or by a portable mixer operated on the project.

Water is necessary to obtain compac-

tion of the stabilized mixture. The compaction is more effectively accomplished by truck traffic or a truck-tire roller than by the usual type of roller. Tests of stabilized gravel roads after thorough compaction have been found to weigh 150 pounds per cubic foot.

One of the most important factors in the construction of these roads is that of crown. There is no need for excessive crown, but recent investigation confirms the need of a suitable crown, 0.4 to 0.5 inch a foot, in roads of this type.

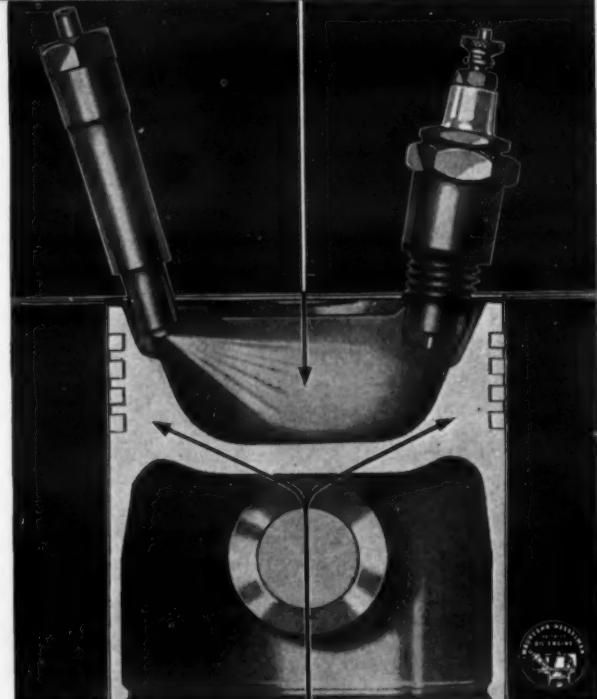
A case in point was an experimental stabilization project which had developed shallow pot-holing at intervals along the center of the road. Several reports were made on visual inspections, which attributed the condition to various inherent and external conditions, no one of which could be specifically attested. However, when later examination involving soil analysis, determination of density, and actual survey of crown and drainage conditions, of the affected and unaffected portions was made, it was definitely shown that

the trouble was correlated and attributable to the nature of the crown only, which in the affected areas was less than 0.2 inch a foot.

### TRY THIS HOBART WELDER FOR 30 DAYS—AT OUR RISK



### COMBUSTION CHAMBER



The combustion chamber of the Waukesha-Hesselman Engine is formed by the concave piston head itself. The piston is a single casting. No slots separate the head from the skirt. The extra metal in the piston head, unbroken by ring grooves, conducts the heat from the head to the skirt.

The Hesselman is fitted with wet sleeve cylinders which rapidly transmit the heat of combustion to the cooling water surrounding the cylinders.

Large capacity water jackets are fed by a water pump which builds up a definite pressure to thoroughly scour valve seats and cylinder heads. Ports and passages direct cooling water in definite paths for uniformly efficient operating temperatures. A thermostat, built into the water manifold, controls the jacket temperatures.

A geared pump delivers full pressure oil to all bearings, shafts and gears within the engine, while crankcase mist flood oils the pistons and cylinders. Pressure is maintained under all conditions of oil level by the patented Oil Level Equalizer. The pressure control valve may be set without stopping the engine or disturbing any of the internal parts.

METAL  
TRANSMITS THE HEAT TO  
PISTON SKIRT BELOW

THIS IS NO. 5 OF A  
SERIES on the Waukesha-Hesselman Oil Engine.  
No. 6 will appear next month. A reprint of the complete series will be mailed on request.

Write today for Bulletin 1000. Waukesha Motor Company,  
Waukesha, Wisconsin.

## WAUKESHA ENGINES



**HY-B-LUM WHEELBARROWS**  
WILL SAVE YOU  
MONEY—  
Our booklet tells  
HOW  
and  
WHY  
SHEET ALUMINUM CORPORATION  
JACKSON, MICHIGAN



## Equipment Shop at Bonneville

Careful daily inspection and prompt attention given to defects and wear and tear on heavy equipment is almost a fetish with the Columbia Construction Co., the contractor for the spillway dam of the Bonneville Project. As a result, its equipment is always up to top efficiency. A complete machine shop is maintained on Bradford Island, where they are able not only to make ordinary repairs and adjustments but practically to take down and rebuild any piece of equipment used.

The shop is in charge of W. E. Harper, Superintendent. It is in a substantial building approximately 75 by 150 feet, served with a travelling crane of 10-ton capacity. There have been as high as 100 men employed there at a time, and the average is around 60. The equipment includes steam hammers, drill presses, radial drills, lathes, shapers, hydraulic press, welding equipment, both gas and electric, cutting equipment, and a full complement of all small tools and accessories necessary to rapid and efficient operation.

Among the heavy machines that are cared for and, at intervals, completely over-hauled are one Bucyrus-Monighan 75-B walking dragline, with 10 and 8-yard bucket; one Bucyrus 75-B electric shovel; one Bucyrus 43-B diesel shovel; one Marion 490; one American-Whirley crane; a fleet of nine LeTourneau buggies, ranging from 16 to 35 yards, with Caterpillar 75-hp tractors; road grader; bulldozers and other smaller equipment. There is also pump work of all kinds, including that on the seven Byron-Jackson deep well pumps of 12,000 gallon capacity, each used in de-watering the cofferdam.

Complete overhauling of motor trucks is done in this shop, although for the ordinary automotive repairs and adjustments a separate automotive shop is maintained.

### Hydraulic Trailer-Scrapers

A hydraulic scraper which moves over the highway as a trailer, known as the Wood-Isaacson Karry-Skraper, is made by the Gar Wood Industries, Inc., Road Machinery Div., Detroit, Mich. This scraper can dig hard, compacted or cemented material, shave light soil, or be used as a finishing machine.

When the going is hard, a master jack raises the rear bottom of the bowl clear of the ground, leaving only the cutting edge in contact. Two side jacks then lift the rear end of the vehicle, transferring its weight to the cutting edge. When the material is light or soft, the vehicle rides on its six wide pneumatic tires and the depth of the

cut is regulated precisely and accurately. For finishing, the bowl is set in dumping position with the cutting edge at the desired relation to the surface of the ground.

One of the features of the Karry-Skraper is the use of five double-acting hydraulic jacks. The slope of the bottom of the bowl, the depth of cut, rate of dumping, depth of spread and stroke of clamshell can be regulated at the will of the operator. Two hydraulic jacks control the clamshell; two hydraulic jacks regulate the position of the front end of the bowl and cutting edge; one master jack regulates the position of the rear end of the bowl.

Another feature is the clamshell gate, which takes advantage of the excess material loosened while the going is easy. Its stroke and capacity is based on that volume of material that accumulates ahead of the bowl. It reaches forward into the loosened material and drags it back into the bowl. The clamshell is fastened to the bowl, its relation to the cutting edge and front ends of the bowl remaining constant, regardless of the position in which the bowl is operating. The clamshell in completing its stroke fills the bowl to capacity. It then seats snugly against the cutting edge and vertical ends of the bowl to hold in the full load. The two side jacks then elevate the bowl.

In dumping and spreading, the side jacks lower the front end of the bowl until the cutting edge clears the ground by the depth of spread desired, the clamshell opens and the master jack lifts the rear end of the bowl to the desired dumping angle.

The Karry-Skraper has a 16-foot wheelbase, an overall length of 24 feet 11 inches and an overall width of 10 feet 5½ inches. Its water-level capacity is 10 cubic yards and with a heaped load, 12 cubic yards. Six and 9-cubic yard scrapers are included in this line.

**SPEED! SPEED! SPEED!** **With REX HIGH SPEED MIXERS**



Rex 2 Bagger with end discharge

**MORE YARDS PER DAY WITH REX SHIMMY SKIP  
REX FAST, ACCURATE WATER SYSTEM  
REX GROUP CONTROLS**



DESIGNED AND BUILT  
TO A. G. C. STANDARDS

Send for full information



**CHAIN BELT COMPANY**  
Home Office—Central and Northwest Divisions: 1666 W. Bruce St., Milwaukee, Wis.  
Eastern Division: 529 Chrysler Bldg., New York, N. Y. — Southern Division: 3704 Lexington Avenue, Dallas, Texas — West Coast Division: 909 Harrison St., San Francisco, Calif.  
**THE MOST COMPLETE LINE BUILT FOR CONCRETE**

### ROGERS GOOSE NECK HEAVY DUTY TRAILERS



**ROGERS BROS.  
CORPORATION  
108 ORCHARD ST., ALBION, PA.**

8 rear wheels mounted on dual pneumatic tires, with 4 rocking axles  
2 rocking axles front, mounted on pneumatic tires

Swinging side brackets to widen the trailer, when necessary

Further details on request

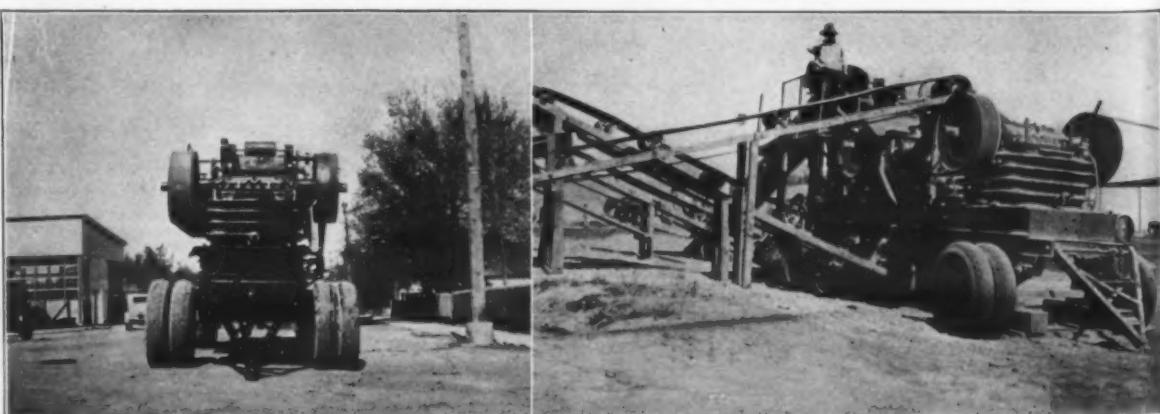
### PATENT on MODERN PORTABLE DUPLEX CRUSHING, SCREENING and LOADING PLANT for SALE

Has the greatest output of any Portable Duplex Plant built, and has only about half the working parts of any other Duplex plant; every part accessible; moving, setup and repair costs

extremely low; designed and adapted to any up-to-date crusher. Patent pertains to the design and arrangements of the working parts of plant. Flow sheet may be had on request.

Write for particulars or see plant in operation

HANK KNIPPEL, Inventor—WESTERN CONSTRUCTION CO., Box 652, POCATELLO, IDAHO



Front view, showing width. Top and bottom in straight line.

Left side front view of plant in action, showing reject conveyor coming out from plant and doubling back to reduction crusher.



The P & H Bantam-Weight 3/8-Yard Shovel

### New All-Purpose Shovel Is Light and Fast

A new full-revolving 3/8-yard excavator, known as the Model 100 Bantam-Weight, has recently been announced by the Harnischfeger Corp. Convertibility is one of the features of this new unit, the lightness of attachments making it practical to convert right on the job in a short time.

All-welded fabrication has reduced weight and increased structural strength, according to the manufacturer. The revolving frame and side stands are a single piece, combining automotive box and X frame in one solid welded structure. The boom is also of light welded tube construction.

A Ford V-8 truck motor, delivering 40 hp at 1,300 rpm, furnishes power for this excavator. With the other main machinery units, it is placed behind the center of rotation to reduce dead counterweight. Diesel power is also available.

Complete specifications and operating data on the Bantam-Weight are available in the new Bulletin 100, copies of which may be secured free on request from the Harnischfeger Corp., Milwaukee, Wis.

### Protecting Steel Against Corrosion

Unprotected steel exposed to any ordinary atmosphere will rust and corrode. Regardless of what theory of corrosion one accepts, the fact is that in order to prevent corrosion it is necessary to cover the steel with a protective material that will hermetically seal the surface of the steel against the action of everything that causes rust or corrosion to develop, Francis M. Hartley, Jr., M. E., points out in a recent issue of *The Dutch Boy Quarterly*, published by the National Lead Co., New York City.

The commonly used surface protection is paint. A knowledge of the composition of a paint is of primary importance in enabling the buyer to judge for himself in advance whether or not a paint is suitable for the purpose for which it is offered. There are many paints on the market, and many claims are made for them, in some cases quite justified and in others, too optimistic.

The buyer is entitled to know what a paint will do before instead of after he has used it. If the composition of the paint is unknown to him, he can not appraise its true value and worth. Under such circumstances the natural and

justified inclination of those in charge of painting operations is to turn to materials of which the composition and proportions are known and those in particular which have stood the test of time on jobs on which accurate data are available. It always pays to buy from reputable firms.

### Stabilized Gravel for Secondary Roads

A rough inventory of our national highway system reveals that of the 3,000,000 miles of public roads in this country, about one half are unimproved. Approximately 500,000 miles are of the so-called improved type, consisting of drained and graded earth but unsurfaced, and about 250,000 miles are surfaced with varying quantities of gravel, crushed stone or slag.

The improvement of this group of low-type roads, as well as the general improvement in the large mileage of the unimproved types, constitutes one of the major problems confronting the highway engineer today.

Some of these roads will be improved with the higher types of construction, but there are thousands of miles which do not require this heavy expenditure as they lie in areas where traffic is relatively light, both in quantity and type of vehicular units.

Government and State highway engineers have concluded that the gravel, crushed stone or slag road, stabilized with calcium chloride, is one of the types to meet this demand, either as a traffic surface or as a base for the more permanent type of surfacing to follow.

The application of the principles of stability to gravel road construction overcomes the faults of the original gravel road, and assures quality by properly combining the graded materials and soil-fines into a stable mixture.

### Tunnel Safety

The effective steps taken by the Sanitary District of Chicago to insure safety in the construction of the intercepting sewers now under way are pointed out in a recent News Letter of the Construction Section of the National Safety Council. These sewers are tunnel jobs, under compressed air. Here are some of the extracts from the specifications:

"The contractor shall furnish and place a sufficient number of fire extinguishers of type approved by the Chicago Board of Underwriters in all buildings at the top of the shaft and in the tunnel.

"The contractor shall provide five or more gas masks of the two-hour type and shall place same in a suitable location for immediate use at the top of the shaft. Each mask shall be installed in a metal cabinet with breakable glass door. Each cabinet shall be equipped with a spare oxygen tank, flashlight and tools for adjustment of masks.

"The masks and self rescuers shall be maintained in a first-class condition and shall be inspected at least once a week by a competent inspector.

"Instruction on the use of the masks and the self rescuers shall be given to all employees and proper warnings

shall be posted at top of shaft against entering tunnel in case of fire or evidence of gas, without the use of gas masks."



### SAVE ON HANDLING COSTS WITH THE UTILITY SPRAY TANK

Contractors and Highway Departments who use the Littleford No. 101 Utility Spray Tank no longer have to load trucks with drums of material to be distributed along the roadside. They load this outfit with bulk material, hitch it to a truck or tractor and are ready to apply material. They save on handling and eliminate cost of packaging.

No. 101 is made in sizes from 300 to 800 gallons—mounted on two or four-wheeled trailer. One hand-spray and an auxiliary spray bar are standard equipment. Air-cooled engine, Viking pump, heat flue and oil burner are included—handles any kind of bituminous material.

Let us tell you more about No. 101, the most remarkable low-cost maintenance unit yet to be offered the highway industry.



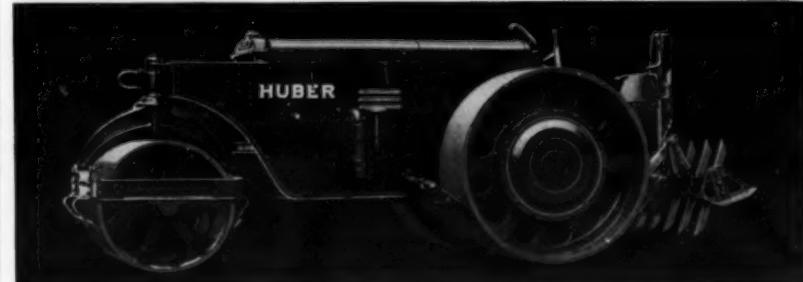
**LITTLEFORD**  
Road Maintenance Equipment  
**SINCE 1900**

LITTLEFORD BROS. 485 E. PEARL ST. CINCINNATI, O.

### WATCH . . .

# HUBER

Watch Huber if you want the most modern road roller value ever offered to the contractors of America. The 5-6-7 or 8 Ton 6 cylinder roller illustrated below contains every modern feature such as full hydraulic control, dual steering (hand or power); removable roller rims; short turns; four speeds forward and reverse; high travel speed; powerful heavy-duty engine. A post card will bring complete specifications and prices.



**THE HUBER MANUFACTURING CO., MARION, OHIO**

### Central States Waterworks Assn.

August 22-23-24, 1935

### Lasting Popularity

This popular hotel has been selected as headquarters. You'll know why, when you come. And what food!

**HOTEL FORT PITT**

**PITTSBURGH, PA.**



Complete crushing, screening and loading plant with primary jaw crusher, secondary roll crusher and power unit. A capacity wonder.  
TELL US YOUR NEEDS AND ASK FOR CATALOG  
**UNIVERSAL CRUSHER COMPANY**  
620 C Avenue West, Cedar Rapids, Iowa

for BETTER ROADS  
at LOWER COST

Not an experiment  
Oldest of its type  
Recognized by engineers  
Imitated by competitors  
Endorsed by users  
Wanted by dealers  
Used by the thousands

800 ROOMS  
\$1.50 to \$3.00  
NONE HIGHER

## Bulletins and Pamphlets

For free distribution to contractors, engineers and officials. Write for the catalogs you need.

### A Powerful Independent Shovel Crowd

384 Northwest says it has the simplest, most powerful independent crowd on its shovel of any one on the market today. Full details and reasons may be secured from Northwest Engineering Co., 1727 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

### Moving Wet Concrete Easily

385 The new F-25 Lansing contractor's barrow easily handles 4 cubic feet of wet concrete per load because it is equipped with a pneumatic rubber tire and roller bearings. The literature and prices of Lansing Co., Lansing, Mich., will interest you.

### Corrugated Culvert for Adequate Drainage

386 Gohi Culvert Mfrs., Inc., Newport, Ky., representing the group of fabricators of Gohi pure iron-copper alloy culverts which withstand the severest abuse and punishment and have a record of longevity, will be pleased to supply you with prices and details of stocks and prompt shipments.

### Rotogravure Magazine on Power Shovels

387 American Hoist & Derrick Co., St. Paul, Minn., will be glad to send you a copy of its new interesting free rotogravure magazine, "American Gopher Shovels" which shows the Model 450 1½-yard power shovel on the job.

### Crawler Tractors That Start Easier

388 A-C oil tractors have a reputation for starting quickly with a push on the starter or a couple of turns on the crank. Allis-Chalmers Tractor Division, Milwaukee, Wis., will be glad to furnish you the facts as to why A-C oil tractors start quicker and operate with fewer repairs.

### Steel and Aluminum Straight-Edges

389 Straight-edges that stay straight and last longer because there are two usable edges, one sharp cornered and squared for dragging, and the other rounded for checking, are made by the L & M Mfg. Co., 10302 Berea Road, Cleveland, Ohio. Ask for the Giantgrip straight-edge circular.

### Steel Forms for Concrete Work

390 Bulletin 200 just off the press gives all the details you want to know about Heltzel steel forms for building concrete roads, sidewalks, curbs and gutters, manholes, pipes, walls, sewers, tunnels and special construction projects. Get your copy from Heltzel Steel Form & Iron Co., Warren, Ohio.

### 44-Page Catalog on a New Diesel

391 A 44-page catalog, 2538, has recently been published by the Caterpillar Tractor Co., Peoria, Ill., featuring the new Diesel Forty tractor. The new booklet is printed in two colors and makes use of model and action pictures to illustrate the text. Copies may be secured by writing to Caterpillar.

### Metal Cribbing Solves Many Problems

392 Armco metal cribbing used by railroads to repair broken wing walls, to solve road-widening problems, for stabilizing road shoulders, to prevent stream encroachment, to hold a sliding cut plus many other uses is described in a leaflet which may be secured from the Armco Culvert Mfrs. Association, Middletown, Ohio.

CONTRACTORS and ENGINEERS MONTHLY  
470 FOURTH AVE., NEW YORK

Please send me the following literature, without cost or obligation

(Indicate by numbers)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

Firm \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

P.S. Also send me catalogs and prices on \_\_\_\_\_

### Distributor With No-Drip Nozzles

393 The Model C pressure distributor made by Littleford Bros., 485 E. Pearl St., Cincinnati, Ohio, is described in literature which will be sent you promptly on request. This distributor heats rapidly, applies accurately and the nozzles don't drip.

### Powerful Hand Hoists for Many Jobs

394 The Beebe all-steel hand hoist, which only weighs 110 pounds and will handle 5 tons, is a unit worth having on any job. Send to Beebe Bros., 2724 Sixth Ave., South, Seattle, Wash., for the name of your nearest dealer.

### Detachable Bits for Rock Drills

395 Crusca detachable bits, in various sizes and designed for efficiency in rock drilling, are described and illustrated in literature which the Crucible Steel Co. of America, 405 Lexington Ave., New York City, will be glad to send on request to those interested.

### Hydraulic Hoists for Heavy Duty

396 Wood underbody slant-type hydraulic hoists for heavy-duty dump trucks, a feature of which is the patented cam and roller action, are described in literature which Gar Wood Industries, Inc., 7924 Riopelle St., Detroit, Mich., will be glad to send on request.

### External Clamps for Construction Jobs

397 Williams external clamps, a feature of which is that they operate only externally, are described and their various uses illustrated in a new catalog which the Williams Form Engineering Corp., 746 Cherry St., Grand Rapids, Mich., will be glad to send on request.

### Reduction Crushers

398 The Bonnot Co., Canton, Ohio, will be glad to send to interested contractors its literature describing and illustrating the ten features of the Bonnot reduction crusher, which is made in two sizes with capacities ranging from 15 to 90 tons per hour.

### Tents, Tarpaulins and Windbreaks

399 The Fulton line of tents, tarpaulins and windbreaks is sold through contractors' supply dealers in every state. Write to Fulton Bag & Cotton Mills, Atlanta, Ga., for the name of your nearest dealer.

### Belt Conveyors That Move Mountains

400 The Jeffrey Mfg. Co., 949-99 No. Fourth St., Columbus, Ohio, maker of all kinds of belt conveyors for handling dirt and other construction material, and the manufacture of the mile of Jeffrey conveyors which are moving a mountain at Grand Coulee, will be pleased to send complete information on heavy-duty belt conveyors for any job, large or small.

### Material Producing Equipment

401 Portable quarry and gravel plants, screening, roll crushers, jaw crushers, asphalt hot-mix plants and traveling road mix plants are among the Cedar Rapids material producing and handling plants which may interest you. The latest catalog of the Iowa Manufacturing Co., Cedar Rapids, Iowa, gives the details and is yours for the asking.

### Hot and Cold-Mix Non-Skid Surfaces

402 Processed Kyrock for hot and cold mix non-slip surfaces, a new development which combines the qualities of natural Kyrock with additional asphalt completely amalgamated with the aggregate, is described in a new booklet which the Kentucky Rock Asphalt Co., Louisville, Ky., will be glad to send on request.

# The BOTTOM PRICE for Top Quality in a 1½-ton 6-cylinder INTERNATIONAL TRUCK



The 1½-ton International Model C-30 with stake body. Other body types available for all hauling needs.

# \$595

f. o. b. factory for the  
1½-ton, 6-cylinder,  
133-inch wheelbase  
Model C-30 chassis—  
standard equipment.

Also available for special needs,  
the 1½-ton, 4-cylinder Model C-20.  
Chassis prices as low as

# \$575

f. o. b. factory

### Quick Facts About

## INTERNATIONAL

### 1½-ton 6-cylinder Model C-30

Six-cylinder engine—78.5 horsepower—hardened exhaust-valve seat inserts—full-floating rear axle—133 or 157-inch wheelbase—any desired body style—most economical in operation of all trucks in its class—lowest priced 1½-ton, 6-cylinder model in International history. Other International sizes range from ½-ton to 10-ton with chassis prices as low as \$400 f. o. b. factory.

**INTERNATIONAL HARVESTER COMPANY**

606 So. Michigan Ave. OF AMERICA (Incorporated)

Chicago, Illinois

# INTERNATIONAL TRUCKS

**Aftercoolers for Large Compressors**

403 Bulletin No. 9212, describing and illustrating the various types of Ingersoll-Rand aftercoolers for large compressors, explaining the reasons for the use of aftercoolers and how the different types fit into certain compressor plant conditions, may be secured by those interested from Ingersoll-Rand Co., 11 Broadway, New York City.

**Increased Gyrotary Crusher Efficiency**

404 Traylor patented non-chokable bell head and curved concaves, which are claimed to increase the efficiency of gyrotary crushers 100 percent, and which can be used to convert any gyrotary into a first class fine reduction crusher, are described in literature which Traylor Engineering & Mfg. Co., Allentown, Penna., will be glad to send to those interested on request.

**A Tractor Derrick for Many Uses**

405 Literature describing the Le Tourneau tractor derrick for loading and unloading heavy equipment, laying pipe, placing pole lines, erecting bridge members and similar uses may be secured by interested contractors and engineers from R. G. Le Tourneau, Inc., Peoria, Ill.

**Self-Priming Centrifugal Pumps**

406 Domestic full-capacity dirt and trash handling drainage pumps for sewer bridge, excavating and road contractors are described and illustrated in literature which the Domestic Engine & Pump Co., Shippensburg, Pa., will be glad to send free on request.

**Complete Line of Jacks**

407 A new catalog No. 235 fully illustrating and describing Simplex screw and lever jacks, trench and timber braces for use by contractors and highway departments may be secured by those interested direct from Templet, Kenly & Co., 1020 So. Central Ave., Chicago, Ill.

**Hydraulic Hoist Bodies**

408 Anthony hydraulic hoist bodies, in a variety of sizes and types to meet the various requirements of road construction and maintenance, are described and illustrated in literature which the Anthony Co., Streator, Ill., will be glad to send on request.

**A Complete Line of Rotary Tools**

409 Catalog SP-1876, describing and illustrating the complete C-P line of Power Vane rotary tools, including drills, grinders, concrete surfacers and similar items, may be secured free on request from the Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

**Heavy Mineral Coated Electrodes**

410 Literature describing Murex heavy mineral coated electrodes in various types to meet all welding requirements may be secured by those interested from the Metal & Thermit Corp., 120 Broadway, New York City.



The New Telsmith Heavy-Duty Pulsator

**New Heavy-Duty Screen Vibrates Uniformly**

A heavy-duty vibrating screen known as the Pulsator has been designed by the Smith Engineering Works, 4014 No. Holton St., Milwaukee, Wis., to screen wet or dry sand, gravel or crushed rock. The eccentric action of the Pulsator produces a circular movement which causes the

aggregate to dance over the wire. The manufacturer claims this movement produces a maximum screening action, uniform on every inch of the wire on every deck and under any load.

The frame is horizontal, compact, rigid and easy to install. The shaft is journalled in a complete, self-contained independent unit mounted on the frame with the screen decks easily unbolted from the frame. The vibrator unit may be removed and taken apart in the field so that repairs, when they become necessary, may be made conveniently.

The nested springs are centrally located to give uniform support to the decks. They carry practically all the load of both the decks and the aggregate, tending to lengthen the life of the end bearings.

The new Telsmith Pulsator is made in eight sizes from 2 x 6 to 4 x 12 inches, single, double and triple deck. It is described in Bulletin No. 066-J which may be secured by readers mentioning this magazine.

**DETROIT MOTOR SCYTHE**

- Here is the most economical and easily handled cutter on the market
- It goes anywhere, cuts anything, and enables one man to do the work of four or more with hand scythes.
- It has a 36-inch sickle driven by a powerful one-cylinder gasoline motor and is mounted on a free running 30-inch wheel, allowing it to be backed up, pivoted sharply, or tilted up or down slightly similar to a wheelbarrow.
- It is now produced by a recognized leader among mower manufacturers and during over four years of service, thousands of users have enthusiastically testified to its dependability.

*Write for prices and Bulletin No. 3*

**DETROIT HARVESTER CO.**  
5450 W. JEFFERSON AVE. DETROIT, MICH.

GEORGE HAISSE MFG. CO., INC.	HAISS	Canal Pl. E. E. 142 Street New York
Send me full details and prices on equipment checked		
FACTORY REBUILT CLAM SHELL BUCKETS		
<input type="checkbox"/> Haisse Rebuilding 1½ yd. Bucket <input type="checkbox"/> Blaw-Knox ¾ yd. Dresserhaft Bucket <input type="checkbox"/> Owen ¾ yd. Digging Bucket <input type="checkbox"/> Haisse 1 yd. HiPower Digging Bucket <input type="checkbox"/> Haisse 1½ yd. Conductor Type Bucket <input type="checkbox"/> Hayward 1½ yd. Type "A" Bucket <input type="checkbox"/> Haisse 1½ yd. Digging Type Bucket <input type="checkbox"/> Hayward 1½ yd. Type "E" Bucket <input type="checkbox"/> Haisse Rebuilt Truck Loader and Belt Conveyors <input type="checkbox"/> Haisse Cropper Type Truck Loader <input type="checkbox"/> Haisse 25 ft. 16 in. Trough Conveyor, 4 cyl. L. & R. <input type="checkbox"/> Haisse 25 ft. 34 in. Trough Conveyor, Elec. Gas.		
Name _____		
Address _____		

**"Exclusive—Yet Not Expensive"**

**COMFORT—CONVENIENCE**  
Two Blocks From Grand Central  
Few Minutes From Pennsylvania Station  
in the Heart of the Shopping & Theatre District.

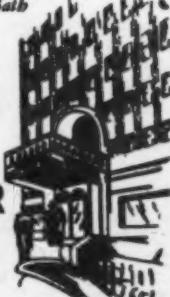
**All Rooms With Bath**

**EUROPEAN PLAN**  
From  
**\$2.50 Single**  
**\$3.50 Double**

**TWO ROOM SUITES**  
From  
**\$4.00 Single**  
**\$6.00 Double**

**The WEBSTER**

40 West 46th Street,  
New York City  
P. W. BERGMANN, MGR.  
Formerly Mgr. Pennsylvania Hotel, New York,  
N. Y.—Shelton Hotel,  
N. Y.



A POINT  
worth  
thinking about

The photograph focuses attention on an important advantage of I-Beam-Lok bridge flooring. The conservative design of I-Beam-Lok provides close spacing of main beams and transverse bars. The small rectangular spaces formed and the strength of the main beams permit the safe operation of trucks and concrete mixers on the unfilled units as soon as they are attached to bridge stringers. This eliminates the need for temporary floors or planking for delivering concrete and materials to the job.

Your finished installation is an armored concrete, anti-skid, long-life wearing surface, free from possibility of the progressive development of large surface cracks. Investigate the many advantages of I-Beam-Lok. Consult with our engineers or send today for descriptive literature.

326

**CARNEGIE STEEL COMPANY PITTSBURGH**

Pacific Coast Representatives • COLUMBIA STEEL COMPANY • San Francisco, California

**United States Steel Corporation Subsidiaries**



**TURNER SUPPLY COMPANY**  
 N. W. Corner of St. Louis and Commerce Sts.  
 MOBILE ALABAMA

## Representing

MCKIERNAN-TERRY CORP.—Pile Hammers  
 INDEPENDENT PNEUMATIC TOOL CO.—  
 Tools Air and Electric  
 WILLIAMS—Champlin and Dragline Buckets  
 AMERICAN STEEL & WIRE CO.—"Monitor"  
 Wire Rope  
 DOMESTIC—Pumps and Hoists  
 M & M Form Clamps  
 WYOMING—Rod Edge Shovels, Scops

LINK-BELT CO.—Crawler Cranes, Shovels, Loaders  
 WESTERN WHEEL SCRAPER CO.—Wheeled Trucks, Drags, Scrapers, Fronts, Ploughs  
 BATES—Bar Ties  
 JAEGER—Concrete Mixers  
 Paving Equip., Chuting  
 WILLAMETTE—Hoists and Winches  
 KILLEFER—Scrapers, Road Dics and Rotters  
 DAVEY—Air Compressors  
 ATHEY—Track Wagons and Truss Wheels

**SHEPHERD TRACTOR & EQUIP. CO.**

150 W. Jefferson St. Los Angeles, Calif.

## Distributors for

CATERPILLAR—Tractors, Graders and Diesel Power Units.  
 LE TOURNEAU—Carryall Scrapers, Angle Diggers, Bull Dozers, Rotters, 25-Yd. Wagons  
 WILLAMETTE—Hoists and Winches  
 LITTLEFORD Asphalt Tools, Kettles  
 MUNDY Hoisting Equipment  
 BUFFALO-SPRINGFIELD Road Rollers

Member: Associated Equipment Distributors

**YANCEY BROTHERS, INC.**  
 634 Whitehall St., SW Atlanta, Ga.

"CATERPILLAR" Tractors, Graders, Power Units, etc.  
 BEEME—Hoist, Shovels, Loaders  
 P. & H. Cranes, Shovels, Draglines  
 BLAW-KNOX Farms, Bins, Buckets, Batchers, etc.  
 BANDER-GREENE Ditch-Dredges  
 HYVAAS Asphalt Distributors  
 WILLAMETTE—Hoists and Winches  
 KILLEFER—Scrapers, Road Dics and Rotters  
 DAVEY—Air Compressors  
 ATHEY—Track Wagons and Truss Wheels

Member: Associated Equipment Distributors

## HOUGH-UNIVERSAL

Sweepers  
 INGERSOLL-RAND AIR Compresors, Tools  
 KILLEFER Road Ripper, Drag Scrapers  
 LA PLANT-CHEATE Crawler Dumper Wagons, Bulldozers  
 Mc KIERNAN-TERRY Pile Hammer  
 WINSLAW Scale  
 CEDAR RAPIDS Crushers  
 DETACHABLE TURN-TO Drill Steel and Bits  
 BAKER-MANEY Wheelers  
 WILMINGTON—Hoists  
 EUCLID Wagons, Bulldozers  
 BALL Wagon Graders

**INDIANA EQUIP. CO., INC.**

327-329 West Market St., Indianapolis, Ind.

## Representing

ATHEY TRUSS—Wagons, INGERSOLL-RAND Compressors, Tools  
 BARBER-GREENE CO.—La PLANT-CHEATE Wagons, Shovels, Bulldozers  
 BUFFALO-SPRINGFIELD Line, Shovels and Cranes  
 NIAGARA—Vibrating Screens  
 OWEN—Class Shell Buckets  
 OMAHA—Dragline Buckets  
 PAGE—Dragline Buckets  
 GENERAL—Shovels and Cranes  
 UNIVERSAL—Crushers, Pulverizers

Member: Associated Equipment Distributors

**ARIZONA TRACTOR & EQUIP. CO.**

138 So. First Ave. Phoenix, Ariz.

"CATERPILLAR" Tractors  
 "CATERPILLAR" Road Machinery  
 ATECO Dirtmovers, Bulldozers, Tamping Rollers and Scrappers  
 ATHEY Truss Wheeled Rollers  
 BUFFALO-SPRINGFIELD Rollers  
 CLEVELAND Rock Drills  
 DAY Crushers

WILLAMETTE-HYSTER Hoists

Member: Associated Equipment Distributors

**SMITH BOOTH USHER CO.**

2001 Santa Fe Ave. Los Angeles, Calif.

BARRIER-GREENE—Ditchers, Excavators, Loaders  
 CEDAR RAPIDS—Crushers  
 CLEVELAND—Crane  
 EASTON—Industrial Cars  
 FREEMAN—Turntables  
 GALLION—Graders, Rollers  
 HOUGH-UNIVERSAL—Sweepers  
 HYBREPRESSURE JENNY—Cranes  
 JAEGER—Mixers, Hoists, Piping, Tower Equipment  
 JEFFREY—Locomotives, etc.  
 JOHNSON—Bins, Batchers  
 BUCYRUS-ERIE Shovels

Member: Associated Equipment Distributors

**F. H. BURLEW COMPANY**

221-225 West Huron St., Chicago, Ill.

Telephone: SUPERIOR 5804

## Representing

BARNES—Pumps  
 BEEFEATER—Wire Bins, etc.  
 BEEFEATER—Shovel  
 CATERPILLAR—Road Finishers, Forms, Chuting  
 CEDAR RAPIDS—Crushers  
 CLEVELAND—Crane  
 EASTON—Industrial Cars  
 FREEMAN—Turntables  
 GALLION—Graders, Rollers  
 HOUGH-UNIVERSAL—Sweepers  
 HYBREPRESSURE JENNY—Cranes  
 JAEGER—Mixers, Hoists, Piping, Tower Equipment  
 JEFFREY—Locomotives, etc.  
 JOHNSON—Bins, Batchers  
 BUCYRUS-ERIE Shovels

Member: Associated Equipment Distributors

**O. T. CHRISTERSON CO.**

122 So. Michigan Ave. Chicago, Ill.

## Representing

KOEHRING COMPANY—Mixers, Pavers, Cranes, Shovel Dumpers, Mud Jacks  
 KWIK-MIX COMPANY—Concrete and Bituminous Mixers  
 G. H. & E. MFG. CO.—Pumps, Saw Bins, Hoists  
 GORMAN-RUPP CO.—Self-Priming Centrifugal Pumps  
 MICHIGAN POWER SHOVEL CO.—Crawler Shovels, Cranes; Truck Shovels, Crane; ½-yard  
 PARSONS COMPANY—Trench Machines, Turbo Mixers  
 LE ROI COMPANY—Air Compressors  
 LITTLEFORD BROS.—Distributors, Tar Kettles, Heaters, Torches  
 CLEVELAND FORMGRADER CO.—Graders, Scrapers, Benders, Form Graders, Straight Edges, Finishing Tools  
 HELTZEL STEEL FORM & IRON CO.—Road Forms, Bins, Batchers

Member: Associated Equipment Distributors

**GIERKE-ROBINSON CO.**

4th &amp; Ripley Sts. Davenport, Iowa

## Representing

BLAW-KNOX—Steel Road, Curb and Gutter Forming Bins, Batchers, Clamshell Buckets, Truck Turntables, Ord Concrete Road Finishers  
 CHAIN BELT—Mixers, Pavers, Pumps, Saw Bins, Conveyors, Elevators  
 CLYDE—Gasoline and Steam Hoists, Derricks  
 SULLIVAN—Air Compressors, Tools  
 TRACKSON—Crawlers, Shovels and Bulldozers  
 THEW-LORAIN—Cranes, Shovels, Draglines  
 TIMKEN—Detachable Rock Bits, Steels  
 UNIVERSAL—Truck Cranes  
 UNIVERSAL—Form Clamps

Member: Associated Equipment Distributors

**THOMAS L. BARRET**

112-114 So. Second St., Louisville, Kentucky

C. H. & E. Pumps and Contractors Equipment  
 WILLIAMS Clamp Shells and Drag Line Buckets  
 HAISE Loader and Material Handling Equipment  
 ARMSTRONG—Blast Hole Drills  
 UNION Hammers and Concrete Buckets  
 HUG Trucks, Turntables and Subtractors  
 MUNDY Hoisting Engine  
 CEDAR RAPIDS Portable Crushing, Screening & Loading Plants  
 METAFORM Road Rails, Wall Forms, etc.  
 HERCULES Road Rollers

NEIL B. McGINNIS CO.  
 1401 S. Center St.  
 Box 1615 Phoenix, Ariz.

## Representing

ADAMS Leasing-Wheel Graders  
 ALLIS-CHALMERS Tractors  
 Barber-Greene Conveyors, and Loaders  
 BRENNIS Rollers & Scrappers  
 BULL BACK Fillers & Builders  
 ERIC Road Rollers  
 F.W.D. Trucks  
 General Shovels, Cranes  
 Gardner-Denver Portable Compressors, Jack Hammers, etc.  
 GOMAS Spreaders

HUBER Road Rollers  
 JAEGER Concrete Mixers, Pavers, Pump, Hoists  
 KELLOGG Wheel Scrapers  
 LE TOURNEAU Heavy Grading Equipment  
 MARSH Portable Paving Plants  
 Master Rotary Scrapers  
 Milwaukee Gas Locomotives  
 Morton Dirt Movers  
 Northwest Shovels, etc.  
 NORTHWEST Shovels, etc.  
 PIONEER Crushing, Screening, Mixing and Loading Plants  
 SNOW KING Rotary Snow Plows

EDWARD R. BACON CO.  
 Folsom at 17th St. San Francisco

ADAMS Black Top Pavers  
 BEARCAT Excavators  
 BURCH Spreaders  
 BYERS Shovels, Cranes  
 CLEVELAND Rock Drills  
 DOBBIE DERRICKS  
 ERIC Tandem Rollers  
 FREEMAN Turntables  
 HERCULINE Jersey Cleaners  
 Hough Sweepers  
 HUBER Road Rollers  
 INTERSTATE Tramways  
 JAEGER Mixers, Hoists, Pumps  
 JOHNSON Bins, Batchers  
 JONES Saw Bunches  
 TALES Torches  
 UNITED 5-T Hd. Winches  
 WALTER Four-Wd. Dr. Trucks  
 WILSON Motor Graders  
 WIARD Plows

Member: Associated Equipment Distributors

NORRIS K. DAVIS, INC.  
 400 Seventh St. San Francisco, Calif.

## Representing

LE ROI CO.—Gasoline Power Units and Parts  
 MINN. STL. & MACHY. CO.—Twin City Engines, parts  
 HANSON CLUTCH & MACHY. CO.—Full Revolving Shovels, Cranes, Draglines, ½, ¾, and 1½-yd.  
 KEYSTONE DRILLER COMPANY—Excavating Machines, Shovels, Cranes, Draglines, Pull-Scoops, Skimmers, Plunger Shovels, Pavement Breakers  
 DAVID COMPANY—Large Tilting Mixers, 1, 2, 3, and 4-yd., Weigh Batchers, Batching Plants, Manual or Full Automatic Operation, Readymix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Steel Silos, Bins, Bunkers, Hoppers, Bunker Gates, Chutes  
 O. K. CLUTCH & MACHY. CO.—Hoists & Compressors

Member: Associated Equipment Distributors

PAUL COCHRAN EQUIPMENT CO.  
 228 N. LaSalle St. Chicago, Ill.

## Representing

THEW Shovel Co.  
 Universal Crane Co.  
 Worthington Pump & Machy. Co.  
 NOVO Engine Co.  
 The Knickerbocker Co.  
 Fairfield Engineering Co.—Conveyors  
 R. B. Equip. Co.—Power Subgraders  
 Iowa Manufacturing Co.  
 Aerol Burner Co.  
 Used Equipment—Rental  
 Member: Associated Equipment Distributors

**SUPERIOR CONSTR. EQ. CO.**

1850 South Kostner Ave. Chicago, Ill.

CONSTRUCTORS, MACHINERY CO.—Mixers, Saw Bins, Air & Electric Vibro Vibrators  
 FEET COMPANY, THE—Concrete and Black-Top Pavements  
 INDEPENDENT PAINT CO.—Paints  
 INGERSOLL-RAND CO.—Truck Turntables  
 AIR TOOLS  
 BYERS MACH. CO.—Cranes, Shovels, Draglines, etc.  
 SCHRAMM, INC.—AIR COMPRESSORS, Tools  
 O. K. CLUTCH & MACHY. CO.—Hoists  
 ROGERS BROS. CORP.—TRAILERS  
 A Complete Line of Construction Tools and Equipment Carried in Chicago. Tel.: Crawford 6290

Member: Associated Equipment Distributors

**ROY C. WHAYNE SUPPLY CO.**

Cor. 5th &amp; Main Sts., Louisville, Ky.

## Representing

J. D. ADAMS CO.  
 INGERSOLL-RAND CO.  
 AEROL BURNER CO., INC.  
 BARBER-GREENE CO.  
 BIRMINGHAM CRANE CO.  
 BUCYRUS-ERIE CO.  
 BUFFALO-SPRINGFIELD ROLLER CO.  
 CAMERON STEAM PUMP WORKS  
 CHICAGO WHEELBARROW SCALE  
 ROGERS BROS. CORP.  
 CLEVER-BROOKS CO.  
 CLYDE SALES COMPANY  
 THE DENNING COMPANY  
 E. I. DU PONT DE NEMOURS & CO.  
 A. B. FARQUHAR CO.  
 Member: Associated Equipment Distributors

Member: Associated Equipment Distributors

RONSTADT HARDWARE &amp; MACHINERY CO.

"Pioneers in Good Merchandising"

TUCSON ARIZONA

BROOKVILLE Locomotives STERLING Portable Pumps

BAY CITY Shovels POMONA Turbine Pumps

GALION Graders and Rollers MYERS Pumps

McCORMICK-DEER-ING Industrial and Crawler Tractors

McCORMICK-DEER-ING Diesel and Gas Power Units

STERLING Hoists

BROWN-BEVIS EQUIP. CO.

49th St. &amp; Santa Fe Ave., Los Angeles, Calif.

American Saw Mill Machy. Co.—Saw Mill, Woodworking Machinery

Barnes Mfg. Co.—Pumps

Briggs and Stratton Corp.—Engines

BUCKEYES Tractor Ditcher Co.—Trenching Machinery

J. I. Case Co.—Industrial Tractors

CHALMERS—Tires Mixers, Pavers, Pumps

CINCINNATI Motors Corp.—Gas Engines

DRAKE William Mfg. Co.—"Omaha" Dragline Buckets

General Excavator Shovels

GEN. HAIR Mfg. Co.—Loaders

Huber Mfg. Co.—Road Rollers

INGERSOLL-RAND CO.—Air Compressors, Air Tools

The Massey Co.—Asphalt Heaters, Tools, etc.

Mallery Logging Equipment Co.—Blocks

Toledo Pressed Steel Co.—Torches, Hoses

Member: Associated Equipment Distributors

CROOK COMPANY

2900 Santa Fe Ave. Los Angeles, Calif.

Southern California Distributors for

ALLIS-CHALMERS—Tractors

BRENNIS—Dics, Rippers, Chisels

BYERS-ERIE—Shovels, Cranes, Draglines

BUFFALO-SPRINGFIELD—Rollers

D-A—Lubricants

HETZEL—Steel Forms

HUTCHINS—Backfillers, Bulldozers

MASK WOODRIDGE—Bulldozers, Scrapers

Sullivan—Air Compressors, Drills, Sharpeners

T. L. Smith—Concrete Mixers

Member: Associated Equipment Distributors

M. D. MOODY  
 ACL No. 2—Sect. 1, Riverside Viaduct  
 Jacksonville, Florida

## Representing

Buffalo-Springfield Roller Co. Freeman Mfg. Co.  
 CYCLOPS Fence Co. Hough-Universal Road Sweepers  
 The Elgin Corporation Allis-Chalmers Mfg. Co.  
 E. D. Etnyre & Co. Ames-Baldwin-Wyoming Co.  
 De Wall Products Co. Clever-Brooks Co.  
 Iowa Mfg. Co. Coffey Hoist Co.  
 Chas. Evans & Co., Inc. Jaeger Machine Co.  
 Littleford Brothers Rawls Mfg. Co.  
 Page Engineering Co. Sullivan Machinery Co.  
 Waukesha Motor Co.

Member: Associated Equipment Distributors

R. S. ARMSTRONG & BRO.CO.

676 Marietta St. Atlanta, Ga.

## Representing

ALLIS-CHALMERS—Tractors  
 AMES-BALDWIN-WYOMING Shovels, Scoops  
 BEEME Hand Hoists  
 BUTLER Bins  
 CARBIC LIGHTS  
 CHICAGO PNEUMATIC Air Compressors  
 DODGE Trucks  
 EMERSON Pumps, Valves  
 FORD MOTOR CO.—Road Machinery  
 GENERAL ELECTRIC Motors  
 JAEGER Concrete Mixers

Member: Associated Equipment Distributors

GARLINGHOUSE BROS.

2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

HANSOME—Concrete Mixers, Pavers, Poles, Placers, Grouters, Concrete Placing Equipment, Steel Forms

WORTHINGTON—Portable Compressors, Pneumatic Tools, Jackhammers, Pumps, etc.

BROWNING—Tire Cranes, Shovels, Laminating Cranes

BYERS—Crawler Shovels and Cranes

GOVEN—Clamshell Buckets

OMAHA—Dragline Buckets

WHITE—Gasoline, Diesel, Electric Locomotives

A. LESCHEN &amp; SONS—Wire Rope

MC KIERNAN-TERRY CORP.—Pile Hammers

LAKEPORT-NATIONAL—Hoists and Cableways

DIAMOND IRON WORKS—Crushers and Portable Gravel Plants

Member: Associated Equipment Distributors

YANCEY BROTHERS, INC.

634 Whitehall St., SW Atlanta, Ga.

Member: Associated Equipment Distributors

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

## Representing

ATHHEY TRUSS—Wagons, INGERSOLL-RAND Compressors, Tools

BARBER-GREENE CO.—La PLANT-CHEATE Wagons, Shovels, Bulldozers

BUFFALO-SPRINGFIELD Line, Shovels, Bulldozers

CATERPILLAR—Road Machinery

EUCLID—Wagons, Shovels, Bulldozers

GEOGRAPHIC—Hoists

HARVEY—Hoists

HOBART—Hoists

KELLOGG—Hoists

LAWRENCE—Crushers, Pulverizers

## Equipment Distributors — Louisiana-Montana

## Contractors and Engineers Monthly for June, 1935 41

### FLETCHER EQUIP. CO., INC.

300 Magazine Street New Orleans, La.

#### Representing

ANCHER Towers and Cranes  
BUTLER Bins, Batchers  
CLYDE Hoisting Engines  
FREEMAN Turntables  
GALION Graders, Rollers  
LE ROI-RIX Portable Air Compressors  
LE ROI Gas Engines  
LINK-BELT Draglines, Cranes and Shovels  
LITTLEFORD Heaters, Kettles  
M & M Form Clamps  
OMAHA Clamshell Buckets  
REX Mixers, Pavers, Pumps and Saw Rigs  
SAUERNAK Cableway Excavators  
STERLING Wheelbarrows and Carts  
SIMPLEX Trench Braces and Jacks  
TOLEDO Torches  
WOOD Molybdenum Stock Shovels

Member: Associated Equipment Distributors

### ALBAN TRACTOR CO., INC.

725-27 East 25th St. Baltimore, Md.

#### Representing

"CATERPILLAR" Diesel Tractors, Motors  
"CATERPILLAR" Road Machinery  
"CATERPILLAR" Combine Harvesters  
GENERAL Excavators  
HARVEY Trucks, Trailers, Plows  
HILLEFER Tillage Tools  
LINK-BELT Shovels & Cranes  
EUCLID ROAD MACHINERY CO.  
CLEVELAND ROCK DRILL CO.  
BARNEY MFG. COMPANY  
LA PLATE-CHEATE MFG. CO.  
BAECK MFG. CO.  
WILLAMETTE-ERSTED CO.  
BAKER MANUFACTURING CO.  
ROTARY SNOW PLOW CO.  
ATHEN TRUCK & WAGON CO.  
NEW WATER CORPORATION  
DAWEY AIR COMPRESSOR CO.  
BLAW-KNOX Bulldozers, Ditchers

Member: Associated Equipment Distributors

### D. C. ELPHINSTONE, INC.

115 S. Calvert St. Baltimore, Md.  
976 National Press Bldg.  
Washington, D.C.

#### Representing

Koehring Co.  
Kwik-Mix Co.  
Lester Mfg. Co.  
Perry Co.  
C. H. & E. Mig. Co.  
Geo. Haiss Mfg. Co.  
Sauerman Bros. Inc.  
Allis-Chalmers Co.  
Gardner-Denver Co.  
L. E. Morris & Co.  
Owen Bucket Co.  
Labour Co., Inc.  
Emerson Pump & Valve Co.

Huber Mfg. Co.

Member: Associated Equipment Distributors

### JOHN C. LOUIS COMPANY

511 W. Pratt St. Baltimore, Md.

#### Representing

JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.  
LAKEWOOD—Finishes, Forms, Towers  
AMERICAN CABLE—Truly Wire Rope  
NORTHWEST—Cranes, Shovels, Draglines  
BUTLER—Bins  
CENTAUR—Road Mowers  
WORTHINGTON—Compressors, Drills, etc.  
ADAMS—Leaning-Wheel Graders  
WHEELING—Corrugated Culvert Pipe  
GOOD ROADS—Crushers  
LITTLEFORD—Asphalt Heater, Distributors  
BURCH—Spreaders  
JOHN DEERE—General  
TIMKEN—Detachable Rock Bits  
HILYARD—NEW BOLD—Hot or Cold Asphalt Mixing Plants  
ALABAMA—Cast Iron Pipe

Member: Associated Equipment Distributors

### THE HENRY H. MEYER CO.

110 S. Howard St. Baltimore, Md.  
628 Munsey Building, Washington, D.C.

#### Representing

Bla-Knox Co.  
Boston & Lockport Bl. Co.  
Ingersoll-Rand Co.  
Syracuse Machine Co.  
Perry Co.  
Chase Oil Burner Co.  
Domestic Eng. & Pump Co.  
Debt-Norton Mfg. Co.  
Diamond Wire & Mfg. Co.  
Galion Iron Works & Mfg. Co.  
Allis-Chalmers Co., Ltd.  
Harrington Co.

Member: Associated Equipment Distributors

### CLARK-WILCOX COMPANY

790-798 Albany St. Boston, Mass.

#### Representing

HANSOME—Concrete Mixers, Chuting Equip.  
NORTHWEST—Cranes, Shovels, Draglines  
BLAW-KNOX—Steel Forms, Bins, Buckets, "Ord" Fin-Jitters  
CARTER—"Hundinger" Pumps  
INGERSOLL-RAND—Air Compressors  
GEAR SELECTION—Hoists, Bolters, Mixers  
ROB—Shovels and Cleaners  
HAUCK—Oil Burners and Heaters  
HAISS—Elevators, Conveyors and Loaders  
ALLIS-CHALMERS—Tractors  
BAKE—Bulldozers  
SEAGRAM—Tow Tractors  
BERGEN—Bulldozers  
CLEVELAND—Formulators  
C. R. JAHN CO.—Trailers  
BURCH—Road Machinery

Member: Associated Equipment Distributors

### THE EQUIPMENT CO.

30 Prentiss St. Boston, Mass.

#### Representing

Link-Belt Cranes and Shovels  
Ingersoll-Rand Compressors and Tools  
"Williams" Buckets and Trailers  
Homelite Pumps and Generators  
COMPLETE RENTAL SERVICE

Member: Associated Equipment Distributors

### HEDGE & MATTHEIS CO.

285 DORCHESTER AVE. BOSTON, MASS.

Providence, R.I.; Portland, Me.; Hartford, New Haven, Conn.; Springfield, Worcester, Mass.; Concord, N.H.  
Aeroil Burner Co.  
American Tubular Elevator Co.  
Austin Machinery Corp.  
Beaumont-Birch Co.  
Dobie Fly & Mach. Co.  
Electric Tamper & Es. Co.  
Erie Steel Construction Co.  
Hercules Mfg. Corp.  
Hillman Mfg. Co.  
Ingersoll-Hall Co.  
Iowa Mfg. Co.  
Jaeger Mfg. Co.  
James-Superior Mfg. Co.  
Keller Electric Machine Co.  
Lakewood Engineering Co.  
Leverett Company  
McKenna-Terry Corp. and  
Lambert Nat'l Hoist Div.  
The Ohio Power Shovel Co.  
Red Star Corporation  
Singer Derrick Co.  
Timken Steel Rolling Co.  
Toledo Pressed Steel Co.  
Universal Form Clamp Co.  
Wehr Company  
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

### THOMAS G. ABRAMS, INC.

Construction Equipment

2411 Fourteenth St. Detroit, Mich.  
Representing  
Aeroil Burner Co.  
Archer Iron Works  
Brookville Locomotive Co.  
(McCormick-Deering Power)  
Butler Bin Company  
Burke Corporation  
Byers Machine Co.  
Domestic Engine & Pump Co.  
LeRoi-Rix Compresors  
St. Regis Paper Company  
Saenger Derrick Company  
T. L. Smith Company  
Smith Engineering Works  
Sterling Wheelbarrow Co.  
Toledo Pressed Steel Co.

Member: Associated Equipment Distributors

### KELLER TRACTOR & EQ. CO., Inc.

5163-69 Martin Ave., Detroit, Mich.

Atco—Dirt-moving equipment and bulldozers  
Baker Mfg. Co.—Snow plows, road machinery  
Blaw-Knox Co.—Finishing machines, road forms, bins, batons and buckets  
Buycroft-Erie Company—Shovels, cranes, draglines  
Chain Bolt Co.—Mixers, pavers, pumps  
Caterpillar Tractor Co.—Tractors, graders, road machinery  
Ditwiller Eng. Co.—Haulage spreaders  
Gardner-Denver Co.—Air compressors and tools  
Killefer Mfg. Co.—Road and farm tools  
LaPlant-Cheate Mfg. Co.—Bulldozers, backfillers, wagons, snow plows  
A. Lesshen & Sons Corp.—Wire rope  
D. Etnyre & Co.—Oil and tar distributors and heaters  
Timken-Rock bits  
Universal Crusher Co.—Gravel Equipment

Member: Associated Equipment Distributors

### CONTRACTORS MACHY. CO.

530 Monroe Ave., N.W. Grand Rapids, Mich.

Jaeger Machine Company  
Lakewood Engineering Co.  
Northwest Engineering Co.  
Sullivan Machinery Co.  
Pioneer Gravel Equipment Mfg. Co.  
Butler Bin Company  
Clyde Sales Company  
Galion Iron Works  
Page Engineering Co.  
American Steel & Wire Co.  
Borch Corporation  
Ross Snow Plows  
Saenger Derrick Company  
Sauerman Brothers

Member: Associated Equipment Distributors

### E. K. S. EQUIPMENT CO.

18 Grandville Ave., S.W. Grand Rapids, Mich.

Representing  
ALLIS-CHALMERS—Tractors, Graders, Wagons, Power Units  
BERG—Concrete Finishers  
CLYDE—Air Tools  
DIAMOND—Crushers, Gravel Plants, Washing Equipment  
FLEXIBLE—Road Joint Machinery  
FOUR-WHEEL DRIVE—  
HEITZEL—Forms, Bins, Batches, HOUGH-UNIVERSAL—Road Sweepers  
HUBER—Rollers

Member: Associated Equipment Distributors

### BORCHERT-INGERSOLL, INC.

St. Paul, Minn.

Allis-Chalmers Tractors and Graders  
"American" Bulldozers, Snow Plows  
Blaw-Knox Bins, Forms, Buckets, Finishers  
B-B Hand Hoists  
Clyde Hoists, Derriks  
Cleveland Formgraders  
Diamond Crushers, Screens  
Domestic Pumps  
Eusil Wagons, Scrapers  
Gopher Road Signs  
Haiss Loaders  
Herrings Road Rollers

Member: Associated Equipment Distributors

### LANGE TRACTOR & EQ. CO.

304 Lake Ave., S. Duluth, Minn.

Aeroil Tar Kettles, Heaters  
Caterpillar Road Machinery and Tractors  
LaPlant-Cheate Wagons  
Bulldozers, Snow Plows, Scrapers  
Koehring Excavators, Blast Hole Drills  
Diamond Gravel Crushing Screening, Washing Plants, Conveyors  
Hiller Scrapers, Road Divers, Diggers  
Davey Air-Cooled Air Compressors  
Cleveland Rock Drills  
Lenhart Wagons  
Ames Baldwin Wyoming Hand Shovels

Member: Associated Equipment Distributors

### THORMAN W. ROSHOLT CO.

928 So. Fourth St. Minneapolis, Minn.

#### Representing

IOWA "Cedar Rapids" Crusher Plants and Equipment  
KOHRSING Pavers, Mixers, Cranes  
INSLEY Towers and ½-yard Shovels  
Koehring Company  
McKenna-Terry Corp.  
The Ohio Power Shovel Co.  
Red Star Corporation  
Singer Derrick Co.  
Timken Steel Rolling Co.  
Toledo Pressed Steel Co.  
Universal Form Clamp Co.  
Walter Company  
WORMAN-RUPP Co., Self-Priming Centrifugal Pumps

Member: Associated Equipment Distributors

### WM. H. ZIEGLER CO., INC.

Minneapolis, St. Paul, Duluth, Minn., Glasgow, Mont.

#### Representing

"CATERPILLAR"—Tractors, Engines, Road Machines  
LA PLANT-CHOATE—Bulldozers, Snow Plows, Dump Wagons  
Le TOURNER—Dirt Moving, Road Equipment  
LISTER—Dirt Moving, Road Ripper  
KILLEFERN—Road Rippers, Scrapers  
ATHHEY—Crawlers, Dump Wagons, Trailers  
BUCYRUS-ERIE—Power Shovels, Cranes, Draglines  
LITTLEFORD—Oil Distributors, Tar Kettles  
PIONEER—Crushers, Gravel Plants  
REX—Mixers, Pavers, Motor Mixers, Pumps, Saw Rigs  
BUTLER—Bins, Batchers

Member: Associated Equipment Distributors

### BUBLITZ MACHINERY CO.

2141 Washington St., Kansas City, Mo.

#### Representing

Jaeger Machine Co.  
Lakewood Engineering Co.  
Thew Shovel Co.  
Harbor-Green Company  
Iowa Manufacturing Co.  
McKenna-Terry Corp.  
Washington-Park & Mackay Co.  
Whiting Locomotive Co.  
Butler Bin Co.  
"Williams"—Buckets and Trailers  
Slosser-McLean Scraper Co.  
Amer Baldwin Wyoming Co.  
MacMahan Co.  
Reeves Products Co.  
Saenger Derrick Co.  
Climax Engineering Co.

Member: Associated Equipment Distributors

### O. B. AVERY COMPANY

1325 Macklind Avenue St. Louis, Mo.

#### Exclusive Distributors for

American Steel Works  
Austin-Western Road Machinery Co.  
Blaw-Knox Co.  
Chain Belt Co.  
Dayton-Sure Grip & Shere Co.  
C. R. Jahn Co.  
Kewanee Machinery & Conveyor Co.  
Kob Manufacturing Co.  
McKenna-Terry Corp.  
Northwest Engineering Co.  
R. B. Equipment Mfg. Co.  
Sullivan Machinery Co.  
Vulcan Locomotive Works  
Kepel Industrial Car & Equip. Co.

Member: Associated Equipment Distributors

### CORBY SUPPLY COMPANY

3942-46 W. Pine Blvd., St. Louis, Mo.

#### Representing

DETROIT HOIST & MACH. CO.—Air and Electric Hoists  
BUCKEYE TWIST DRILL CO.—Twist Drills and Beams  
BUHL CO.—Portable Air Compressors  
CHAMPION REED CO.—Bridges and Welding Rod  
DETROIT HOIST & MACHINE CO.—Air Hoists  
HARDSCOG WONDER DRILL CO.—Rock Drills, Pneumatic Breakers  
WM. H. KELLER, INC.—Super Pneumatic Tools  
PENNYSVILLE AIR COMPRESSOR & PUMPS  
DODGE ROUND & SON—Chain Hoists  
RIVET CUTTING GUN CO.—Rivet Busters  
N. A. STRAND & CO.—Flexible Shaft Equipment  
UNION—Portable Woodworking Tools  
VAN DORN—Electric Drills, Drills, Buffers  
VICTOR—Welding and Cutting Torches  
WESTINGHOUSE—Arc Welding Equipment  
GUSTAV WIEDEKE & CO.—Tube Expanders

Member: Associated Equipment Distributors

### JOHN FABICK TRACTOR CO.

Gravois & Iowa Aves. St. Louis, Mo.

#### Representing

Athey Truss Wheel Co.  
Cleveland Rock Drill Co.  
Blaw-Knox Company  
Caterpillar Tractor Co.  
Davey Compressor Co.  
Euclid Road Machinery Co.  
Killefer Mfg. Co.  
LaPlant-Cheate Mfg. Co.  
Pioneer Gravel Equip. Mfg. Co.  
Thev Shovel Company  
Willamette-Ersted Co.  
W. K. M. Company

Member: Associated Equipment Distributors

### JOSEPH KESL TRACTOR & EQUIP. CO.

1510 North 13th St. St. Louis, Mo.

#### Representing

Allis-Chalmers Mfg. Co.  
American Steel Scraper Co.  
The Big Mfg. Co.  
Wm. Bros. Boiler & Equip. Co.  
Cushman Motor Works  
Erie Steel Construction Co.  
Gardner-Denver Co.  
General Wheelbarrow Co.  
Lyle Sign Co.  
Mail Tool Co.  
Talson Pressed Steel Co.  
Aeroil Burner Co., Inc.  
Contractor's Machinery Corp.  
Domestic Steel & Pump Co.  
Iowa Manufacturing Co.  
Orw & Sonnen, Inc.  
Mack Woodridge Co., Inc.

Member: Associated Equipment Distributors

### C. F. RABBEITT, INC.

1523 N. Broadway St. Louis, Mo.

#### Representing

G. H. & E. Mfg. Co. Littleford Bros.  
Cleaver-Brooks Company Parsons Company  
Cleveland Farmgrader Co. Union Iron Works, Inc.  
Huber Mfg. Company Butler Bin Company  
Insey Mfg. Company Frank G. Hough Company  
Koehring Company Metal Forms Corp.  
Kwik-Mix Mixer Kuhlwein Company  
Lidgewood Mfg. Company Sherman Machinery Corp.  
Member: Associated Equipment Distributors

Member: Associated Equipment Distributors

### THE GEO. F. SMITH CO.

Franklin & Channing Aves., St. Louis, Mo.

#### Complete Plants Rented

Vulcan—Steam and Drop Hammers  
Wankers—Engines  
Mail—Vibrators and Grinders  
Archer—Tower Equipment  
Red Star—Wheelbarrows and Shovels  
Temperton, Kenly & Co.—Tire Brackets, Jacks  
Smith—Mixers, Pavers  
Vall—The Wires and Tools  
American Steel & Wire—Hoists

Member: Associated Equipment Distributors

### TULLEY EQUIPMENT CO., INC.

4215 Clayton Ave. St. Louis, Mo.

#### Representing

ORTON—Cranes, Shovels, Draglines, Buckets  
LEACH—Mixers, Tower Outfits, Saw Rigs  
ROGERS BROS.—Trailers  
HUMPHREYS—Pumps  
MILWAUKEE—Gasoline Locomotives  
MCALANAHAN & STONE—Crushers, Screens  
Reinforcing Steel and Accessories  
Asphalt and Rubber Expansion Joint  
Road Building Materials

Member: Associated Equipment Distributors

### CONNELLY MACHINERY CO.

2706 Montana Ave. Billings, Mont.

#### Distributors of

Caterpillar Tractors, Engines, Road Machinery  
Pioneer Gravel Plant Equipment  
Bucyrus-Erie Loadmasters, Draglines, Hoists  
LaGrange Tu-Way Trailers  
Hough Universal Road Sweepers  
Standard Paving and Plant Distributors  
Mix Oiling Plants  
Dale Fabricants, Oils  
Hewitt Bolting, Hose  
Tractor-operated Heists, Scrapers, Ditchers, Trailbuilders, Backfillers, Shovels, Pavers, Leaders, Track-type and Wheeled Wagons and Trailers, etc.

Member: Associated Equipment Distributors

### MIDLAND IMPLEMENT CO., Inc.

Billings, Montana

#### Representing

FORDSON—Tractors and Industrial Equipment  
BARGER-GREENE—Conveyors, Ditchers and Loaders  
DIAMOND IRON WORKS—Gravel Equipment  
BRENNIE'S—Rippers and Scarifiers  
HOPPER—Hoists and Winches  
LANSING—Column Jaws and Barrows  
SCHRAMM—Compressors  
WHEELING CORRUGATING CO.—Metal Culverts  
KOENRING—Shovels, Drag Lines and Concrete Mixers  
INDUSTRIAL & TRUCK FLARES  
BROWN & SHAWCOCK WIRE ROPE CO.—Wire Rope and Cable  
ROGERS—Trail Dumpers and Oiling Equipment  
WM. BROS. MFG. CO.—Snow Plows and Rollers  
GOODRICH—Transmission and Conveyer Belting  
KENSINGTON—Crusher Jaws, Caterpillar Treads, etc.  
CLEVELAND—Rock Drills

Member: Associated Equipment Distributors

### HALL-PERRY MACHINERY CO.

802-12 E. Iron St., Butte, Mont.

#### Representing

<b>HEYNIGER BROTHERS</b> <i>Contractors' Equipment</i> 6th Ave. and F St. Belmar, N. J. JAEGER Concrete Mixers JAEGER Placing Plants AEROIL Torches, Heaters Steel Sidewalk and Curb Forms "Mud Hog" Pumps Material Elevators Air Compressors Gasoline Hoists Trench Pumps Carbide Lights	<b>COMPLETE MACHINERY &amp; EQUIPMENT CO., Inc.</b> <i>"Specialists in Pumps"</i> Webster Ave. and Hancock St. Long Island City New York Representing RALPH B. CARTER CO.—Humdinger Self-Priming Centrifugal Pumps HUMPHREYS MFG. CO.—Diaphragm, Plunger and Centrifugal Pumps LEACH CO.—Concrete Mixers INGERSOLL-RAND CO.—Air Compressors COMPLETE—Well Point Systems—Steel Blasting Mats— RENTAL SERVICE Member: Associated Equipment Distributors	<b>JOHN REINER &amp; CO., Inc.</b> 29 Howard St. New York, N. Y. Representing NOVO ENGINE CO.—Gasoline Engines WISCONSIN MOTOR CORP.—Gasoline Engines and Power Units POWER MFG. CO.—Diesel Engines PERFEX RADIATOR CO.—Radiators MASON DIESEL ENGINE CO.—Diesel Engines and Generating Sets TWIN DISC CLUTCH CO.—Clutches Telephone CANal 6-6286	<b>THE BLAISDELL-FOLZ EQUIP. CO.</b> 205-219 West Pearl St. Cincinnati, Ohio Representing Allis-Chalmers Mfg. Co.—Tractors, Road Machinery Chain Belt Co.—Belt Pavers, Moto-Mixers, Building Mixers and Pumps Hawthorne Engineering Co.—Gasoline Shovels, Cranes, Dragline, Scraper, Shovel Ingersoll-Rand Co.—Compressors, Pneumatic Tools, Pumps Clyde Sales Co.—Hoisting Engines, Derricks Drive-Doyle Co.—American Tubular Towers Sauermeyer Bros., Inc.—Cableways, Power Scrapers, Builders Universal Crusher Co.—Crushers The G. W. Johnson Co.—Bins, Batches Deister Machine Co.—Plat-O Vibrator Screens Vulcan Iron Works—Pile Hammers Wolman Engineering Co.—Crashers, Dragline Buckets Sanger Derrick Co.—Derricks Member: Associated Equipment Distributors
<b>DALE &amp; RANKIN, INC.</b> 113 Frelinghuysen Ave., Newark, N. J. Representing HELTZEL Road Forms and Bins P & H Cranes and Excavating Equipment P & H Hansen Electric Arc Welders INGERSOLL-RAND Compressors and Tools STERLING Wheelbarrows AEROIL Heaters and Tools ALEMITE Guns and Fittings REX Mixers and Pavers REX Pumps REX Saw Rigs UNIVERSAL Concrete Accessories WINSLOW Scales Member: Associated Equipment Distributors	<b>GEORGE MALVESE &amp; CO.</b> New Hyde Park, N. Y. Long Island Distributors: CLETRAC Crawler Tractors PLYMOUTH Tractors ADAMS Graders SARGENT Snow Plows WORTHINGTON Power Mowers	<b>United Hoisting Co., Inc.</b> 165 Locust Avenue NEW YORK, N. Y. Representing Sullivan Machinery Co. Construction Machinery Co. G. M. T. Company Member: Associated Equipment Distributors	<b>THE MECHANICAL SUPPLIES COMPANY</b> 205-207 Vine St. Cincinnati, Ohio Representing LAKEWOOD—Finishers, Subgraders, Graderooters, Road Forms, etc. NOVO—Gasoline Engines, Brisks, Pumps, etc. WORTHINGTON—Air Compressors, Rock Drills, Paving Stones, etc. GENERAL—Shovels, Cranes, Excavators, etc. JAEGER—Truck Concrete Mixers KILLEFER—Road Rollers and Rippers, Road Dism. Scrapers, etc. JONES-SUPERIOR—Portable Saw Tables, etc. COLUMBUS—Elevators and Conveyors SIMPLICITY—Screens OSGOOD—Shovels, Cranes, etc. HERCULES—Rollers
<b>JOHNSON &amp; DEALAMAN, INC.</b> 60 Marshall Street Newark, N. J. Representing RANSOME Pavers, Mixers, Chuting Equipment SCHRAMM Air Compressors, Tools ALLIS-CHALMERS Tractors, Graders JAEGER—Road Paving Machines, Truck Mixer, Road Pavers JOHNSON Bins and Batches ERIE Gasoline Rollers BAY CITY Truck Cranes MARLOW Centrifugal, Diaphragm and Plunger Pumps ETNYRE Tar and Asphalt Distributors WILLIAMS Trailers and Buckets RED STAR Wheelbarrows, Batch Boxes, Column Clamps and Adjustable Sliders OSGOOD Shovels, Cranes and Draglines GENERAL Shovels, Cranes and Draglines HOTCHKISS Road and Sidewalk Forms	<b>R. E. BROOKS COMPANY</b> <i>Equipment for Contractors</i> 50 Church Street New York, N.Y. NATIONAL EQUIPMENT CORP. INSLEY MFG. CO. PARSONS CO. C. H. & E. MFG. CO. KOEHRING CO. HANDY BACK BALER CO. BLAW-KNOX CO. CLEAVER-BROOKS CO. ROBOCO MFG. CO. HUG CO. "ORD" Concrete Road Finisher	<b>N. P. WALTON, JR.</b> 50 Church Street New York, N. Y. Representing D. C. ELPHINSTONE, INC.—"BEST" Stone and Chip Spreaders ERIE STEEL CONSTRUCTION CO.—All-Steel Bins, Complete Aggregater Plants—Eric Buckets—Clamshell, Dragline and Electric. IOWA MFG. CO.—"CEDAR RAPIDS" Crushers, Material Handl. Equip., Sand, Gravel and Asphalt Plants THE KRON CO.—Full-capacity Springless Dial Scales METAL FORMS CORPORATION—Metaform Road Rolls, Sidewalk and Curb Forms THE "WHEELLED ROLLER" CORP.—Wheel-ed-Type Portable Surface Rollers	<b>THE CLETRAC OHIO SALES CO.</b> E. 193rd Street and Euclid Ave. Cleveland Ohio Representing THE CLEVELAND TRACTOR CO.—Crawler Tractors THE DAVEY COMPRESSOR CO.—Air-Cooled Compressors THE EUCLID ROAD MACHY. CO.—Crawler Wagons, Scrapers THE WALSH SNOW PLOW CO.—Snow Plows D-A LUBRICANT CO.—Oil THE ROC COMPANY—Winches
<b>SLADE TRACTOR CO., Inc.</b> 36 Learned Street Albany, N. Y. Representing "CATERPILLAR" Tractors, Road Machinery, Combines and Snow Plows EUCOLID Rotary and Wheel Scrapers, Track Wheel Wagons KILLEFER Agricultural Implements and Contracting Tools WILLAMETTE-HYSTER Hoists for "Caterpillar" Tractors ATHY TRUSS Wheel Wagons and Trailers DETROIT HARVESTER Mowers and Snow Brush SCHRAMM Air Compressors W-KM Booms for "Caterpillar" Tractors DORSEY Stump Puller BLAW-KNOX Alco Equipment MICHIGAN Power Shovels CENTAUR Hi-way Mowers	<b>A. P. DIENST CO.</b> <i>Contractors' Supplies</i> 140th St. & 3rd Ave., New York, N. Y. Distributors for GREDAC Grease TOLEDO Bull Frog Wheelbarrows WYOMING Red Edge Shovels DUFF Sewer Trench Braces CURRY Wire Ties KEYSTONE Grease Telephone MOTT Haven 9-5430	<b>BREWSTER &amp; WILLIAMS, INC.</b> <i>Contractors' Supplies and Equipment</i> 306 S. Salina St. Syracuse, N. Y. Representing BUTLER Bins and Measuring Hoppers C. H. & E. Contractors' Pumps, Hoists, Saw Rigs HAISS Loaders, Excavators, Conveyors and Buckets HOTCHKISS Steel Forms LA CROSSE Tu-Way Trailers LITTLEFIELD Asphalt Heaters and Tools OSGOOD Shovels, Draglines and Cranes RANSOME Mixers, Pavers, Towers and Chutes SULLIVAN Compressors, Drills and Hoists WEHR Power Graders Member: Associated Equipment Distributors	<b>THE DAY &amp; MADDOCK CO.</b> Equipment Headquarters 8201 Almira Ave., Cleveland, O. Representing American Hoists and Snow Plows La Crosse "Tu-Way" Trailers American Terry Derriks Kelley Fleet Machines American Scrapers & Road Mall Vibrators & Grinders Drags Barnes Pump National V-G Carbide Lights Cleveland Formgraders Sauermaier Crescent Scrapers German Pump Self-Priming Globe Pump Co. 4-in. & Blocks Haus Loaders Steel Wheelbarrows Hercules Road Rollers Hill Surfers Hill Surfers Independent Pneumatic & Toledo Torches Independent Electric Tools Universal Crushers
<b>DOW &amp; COMPANY, INC.</b> "Equipment for Highways" Court & Wilkeson Sts., Buffalo, N.Y. C. H. & E.—Pumps, Hoists, Saw Rigs BARCO—Gasoline Hammer CHICAGO PNEUMATIC TOOL CO.—Compressors, Drills ADAMS—Leaning Wheel Graders BURN—Spreaders, Maintainers, etc. CATHERPILLAR—Excavators EUCLID—Earth Moving Equipment HOUGH-UNIVERSAL—Sweepers MCCORMICK-DEERING—Tractors "METAFORMS"—Concrete Forms MONAWA—"Hotsell" Kettles, Burners THE LORAIN—Shovels, Cranes UNIVERSAL-LORAIN—Shovels, Truck Cranes T. L. SMITH—Mixers, Pavers, Tower Pavers WILLIAMS—Buckets, Trailers WALTER—Snowplows, Tractor Trucks FINK—Snow Plows	<b>J. C. HOUSTON</b> 50 Church Street New York, N. Y. Representing BROWNING CRANE & SHOVEL CO. HOISTING MACHINERY CO. Warehouse ELIZABETH, N.J.—L.V. R.R.	<b>THE SYRACUSE SUPPLY CO.</b> 314 W. Fayette St. Syracuse, N. Y. Warehouse 358 W. Jefferson St. Representing ATLAS Powder Co. ATHY TRUSS WHEEL CO. Barber-Green Co. BARNES MFG. CO. BLAW-KNOX CO. CATERPILLAR TRACTOR CO. Centaur Tractor Co. Clyde Sales Co. Euclid Mfg. Co. Evinrude Corp. Goodway Tire & Rubber Co. Goulds Pump Co. Hazard Wire Rope Co. Ingersoll-Rand Co. John-Manville (Expansion Joint) Timken Roller Bearing Service & Sales Co.— Timken Bits & Rods Member: Associated Equipment Distributors	<b>H. B. FULLER EQUIP. CO.</b> 1836 Euclid Ave. Cleveland, Ohio Representing Blaw-Knox Company—Bins, Batches, Forms, Trunkmixers, Buckets, GRD Finishing Machines, Asphalt Plants Buckeye Tractor Co.—Shovels, Cranes, Draglines, Locomotives Crane Co.—Concr. Mixers, Pavers, Chuting Equip. Baldwin Locomotive Works (Internal Combustion Division)—"Whitcomb" Locomotives—Gasoline, Diesel, Elec. and Storage Battery Locomotives Electric Tamper & Equip. Co.—Concrete Vibrators, Elec. Tamper Foster & Bennett Corp.—Road Shoulder Finishers, Pavers Concrete Surfacing Machinery Co.—"Berg" Surfacing DeWalt Products Corp.—Power Saws Mohawk Asphalt Heater Co.—Asphalt Kettles, Heaters
<b>LLOYD G. ROSS</b> 3090 Main St. Buffalo, N. Y. Representing General Excavator Co. Hercules Roller Co.  Sale and Rent of All Kinds of Construction Equipment	<b>MAHONEY-CLARKE, INC.</b> Complete Line of Contractors' Equipment and Supplies 217 Pearl Street New York, N. Y. Representing BATES Wire Ties HERCULES Road Rollers LAY-SET Preformed Wire Rope MARLO Self-Priming Pumps MUNSELL Pneumatic Concrete Vibrators OSGOOD Shovels, Cranes, etc. STANLEY Electric Drills, Saws, etc. THURSTON Detachable Bits VULCAN Pile Hammers, Extractors and Parts WILEY and BLAW-KNOX Concrete Buckets GENERAL Shovels, Cranes, etc. INGERSOLL-RAND Air Compressors	<b>NORTH CAROLINA EQ. CO.</b> P.O. Drawer 426, 3116 Hillsboro St. RALEIGH, NORTH CAROLINA American Cable Company Internal Harvester Co. Aerial Burner Company Jaeger-Lawrence Company Aeroil Burner Company Koehring Manufacturing Co. Caterpillar Tractor Co. L. B. Johnson Co. Cleveland Rock Drill Co. Kinney Manufacturing Co. Continental Bell & Steel J. F. Klemm Company Foundry Co. Miami Trailer & Scraper Day Pulverizer Company Company Euclid Tractor Co. Parson's Co. The Four W. Co. Ramsey Pump Co. Galion Iron Works & Mfg. Co. Universal Form Clamp Co. Galion Allis-Steel Body Co. Wickwire Spangler Steel Good Roads Mach. Corp. Williamsport Wire Rope Co. Hansel Clutch & Machinery Co. Timken Roller Bearing Service & Sales Co.— Iowa Manufacturing Co. Timken Bits & Rods Member: Associated Equipment Distributors	<b>INDUSTRIAL ENGINE PARTS, INC.</b> 1053 E. 61st St. Cleveland, Ohio Representing Minneapolis-Moline Power Impl. Co. Climax Engineering Co. Twin Disc Clutch Co. Fuller & Johnson Mfg. Co. Wisconsin Motor Corp. (Air-Cooled) Sierra Engine & Mfg. Co. Scintilla Magneto Co. Wise Electric Co. Pierce-Governor Co. Portable Power Tool Corp. Hercules Prod. Co. LeRoi Co.
<b>EUGENE F. VAN NAME</b> 116 John Street Horseheads, N. Y. Representing ALLIS-CHALMERS—Tractors, Graders A-W—Traffic Tread BAKER—Road Drags, Snow Plows C. M. C.—Wonder & Marsh-Capron Mixers HUBER—Rollers HOTCHKISS—Sidewalk Forms HANSON—Excavators INGERSOLL-RAND—Air Compressors JACKSON—Wheelbarrows MILES—Concrete Block Machines THE NORTHERN—Gravel & Coal Conveyors WILLIAMS—Wire Rope WISCONSIN SPECIAL—Snow Plows	<b>H. O. PENN MACHY. CO., INC.</b> 140th St. & East River Bronx, N. Y. Representing MARION Shovels—% to 2-1/2 cu. yds. CATERPILLAR Tractors—% to 2-1/2 cu. yds. LaPlant-Choate Wagons and Bulldozers BLAW-KNOX Scops MARLOW Pumps WARCO Graders PIERCE Rollers Warehouse Stock—Service Station Member: Associated Equipment Distributors	<b>CAROLINA TRACTOR &amp; EQUIPMENT COMPANY</b> S. Main Ext. Salisbury, N. Car. Branch Office and Warehouse: 733-35 West Hargett St., Raleigh, N. Car. WORTHINGTON—Air Compressors and Drills ETNYRE—Bituminous Distributors, Flushing CATERPILLAR—Tractors, Graders, Power Plants BLAW-KNOX—Steel Forms, Bins, Buckets, Truckmixers BARBER-GREEN—Conveyors, Car Unloaders DIAMOND—Roll, Jaw Crushers HERCULES—Gas Road Rollers LORAIN—Gas Road Rollers SLINGER—Gasoline Wagons, Bulldozers SLINGER—Wheeler—Wheeler, Rippers, Frontend THEW—Shovels, Cranes WONDER—Mixers, Pump, Hoists Member: Associated Equipment Distributors	<b>W. T. WALSH EQUIPMENT CO.</b> 3088 West 106th St., Cleveland, Ohio. Tel. Lakewood 1024 Representing American Floor Surfacing Hough-Universal—Sweepers Machine Co.—Surface Huber Mfg. Co.—Road Rollers Grinders Anthony Company—Dumbell Grinders Trucks, Hydraulic Hoists Jaeger-Lawrence—Equipment Darse Mfg. Co.—Gasoline McCormick-Darling—Trac-Tors Hammers Bosch Company—Crushers McLeister Corp.— Brookville Locomotive Co.—Tire Hammers Locomotive W. B. Foster Mfg. Co.— Hoist Patrels & Beams Foster Bin Co.—Bins and Rock Equipment Foster Road Machy. Co.— Wagons Gardner-Dresser Co.—Concrete Williams Buckets Processors and Air Tools White Mfg. Co.—Chassis Gunter Co.—Concrete Piping White Asphalt Plants and Machinery Member: Associated Equipment Distributors

## Equipment Distributors — Ohio-Wisconsin-Canada

## Contractors and Engineers Monthly for June, 1935 43

## THE TAYLOR TRACTOR CO.

285 Coopers St. Columbus, Ohio

## Representing

Caterpillar Tractor Company—Tractors, Road Machinery, Diesel Engines  
Harnischfeger Sales Corp.  
LaPlant-Cheate Mfg. Co.  
Athey Truss Wheel Co.  
Killefer Manufacturing Corp.  
Baker Manufacturing Co.  
Williamette-Ersted Co.  
Blaw-Knox Co. (Atco Div.)  
All Steel Products Mfg. Co.

## HOWARD W. READ CORP.

800 N. Delaware Ave., Philadelphia, Pa.

## Distributors

DOMESTIC ENGINE & PUMP CO.—Pumps  
JONES SUPERIOR—Saw Blis  
LINK-BELT—Cranes and Shovels  
PENNA. BOILER WORKS—Boilers  
AUSTIN-WESTERN ROAD MACHINERY CO.—Rollers, Graders, etc.

## Additional Equipment in Stock:

McKERNAN-TERRY—Hammers  
INGERSOLL-RAND—Compressors  
UNIVERSAL—Truck Cranes

## BROOKS-PAYNE-OSBORNE EQUIPMENT CO.

Tel: 2-4523  
Knoxville 408 Davenport Rd. Tennessee

## Representing

Bucyrus-Erie Co.—Shovel, Cranes, Draglines  
International Harvester Co.—Cranes, Tractors  
J. D. Adams Co.—Road Machinery  
Gardner-Denver Co.—Compressors, Drills  
Timken Roller Bearing Co.—Detachable Bits  
Holtz Steel Form & Iron Co.—Blast, Batchers  
Chas. Hvass & Co., Inc.—Distributors  
Continental Oil Co.—Steel Co.—Woodbridge Trailblazers  
Lakewood Engineering Co.—Mixers, Concrete  
Linn Manufacturing Corp.—Linn Tractors  
Pioneer Gravel Equip. Mfg. Co.—Crushing, Screening  
Plants  
Hewitt Rubber Corp.—Hoists and Belts  
Mobiline Corning Oil Co.—Tractor Lubricants  
Independent Pneumatic Tool Co.—Pneu. & Elec. Tools  
Taylor-Warren Iron & Steel Co.—Steel Castings

## PACIFIC HOIST &amp; DERRICK CO.

Machinery and Equipment  
3200 4th St. Seattle, Wash.

## Representing

NORTHWEST—Gas and Electric Shovels, Cranes and Draglines  
BUHL—Air Compressors  
TWIN DISC—Clutches for all purposes  
PAGE—Scraper Buckets, Diesel Draglines  
MINNEAPOLIS—Twin City Gas Engines  
CLIMAX—Gasoline Engines  
WISCONSIN—Gasoline Engines  
MARMON-HERRINGTON—Trucks  
DAKE ENGINE CO.  
PIONEER—Gravel Equipment  
ISAACSON IRON WORKS—Buckets  
CLETRAC—Tractors  
Member: Associated Equipment Distributors

## SOUTHERN OHIO EQUIP. CO.

169-171 W. Main St., Zanesville, Ohio

## On Route 40

## Phone 813

## Distributors for

Allis-Chalmers Mfg. Co. Timken Roller Bearing Co.  
Iowa Mfg. Co. D-A Lubricant Co.  
Osgood Co. Shunk Mfg. Co.  
General Excavator Co. MacWhye Co.  
Hercules Co. Traskon Co.  
W. A. Riddell Co. Apollo Culvert Works  
Schramm, Inc. Slusher-McLean Co.  
Cleveland Rock Drill Co.

## CLYDE EQUIPMENT CO.

Contractors' Equipment and Supplies

Portland, Ore. Seattle, Wash.

Atlas Imperial Diesel Eng. Sullivan Brothers  
Blaw-Knox & Western Pipe Sullivan Machinery Co.  
Taylor Eng'r. & Mfg. Co.  
Clyde Iron Works T. L. Smith Co.  
Hemelite Corp. Allis-Chalmers Mfg. Co.  
Lincon Electric Co. Leistel Company  
Bucyrus-Erie Co. Beebe Bros.  
Gen. Haiss Mfg. Co., Inc.

Member: Associated Equipment Distributors

## SERVICE SUPPLY CORPORATION

20th and Venango Sts., Philadelphia, Pa.

## Representing

Chain Belt Co.—Rex Pavers, Mixers, Truck Mixers, Pumps  
Owen Buck Co.—Clamshell Buckets  
Dravo Equipment Co.—American Tubular Towers  
Hercules Co.—Road Rollers  
International Harvester Co.—Industrial Tractors, Crawlers  
Lidgerwood Mfg. Co., Inc.—Hoists, Winches, Cableways  
Bay City Shovels, Inc.—Shovels, Cranes and Cramenobles  
W. A. Riddell Co.—Graders, Scrapers & Tracks for Tractors  
Beaumont-Birch—Bins, all sizes  
Chicago Pneumatic Tool Co.—Air Compressors and Tools  
Littleford Bros.—Asphalt and Tool Heaters, Distributors  
Member: Associated Equipment Distributors

## J. JACOB SHANNON &amp; COMPANY

1744—Market Street—1744 PHILADELPHIA

## Representing

Jagger Machine Co.—Concrete, Truck Mixers, Pumps  
Lakewood Engineering Co.—Road Spreaders, Material Trucks  
Allis-Chalmers Mfg. Co.—Tractors, Graders  
Baker Mfg. Co.—Bulldozers, Snow Plows  
American Hoist & Derrick Co.—Crawler Cranes, Revoivers, Derricks  
American Terry Derrick Co.—Derricks, Travelers  
John A. Roebing's Sons Co.—Hoist, Cable Slings  
E. J. du Pont de Nemours & Co.—Paints and Varnishes  
Concrete Surfacing Machy. Co.—"Berg" Concrete Surfers  
Red Star Products Co.—Adjustable Shores, Column Clamps  
Universal Form Clamp Co.—Concrete Accessories  
Sagam Derrick Co.—Derricks and Winches  
Mobile Hoisting Engine Co.—Gas, Electric and Steam Hoists  
Ingersoll-Rand Co.—Air Compressors, Pneumatic Tools

Member: Associated Equipment Distributors

ALLEGHENY EQUIPMENT CORP.

1218 Grant Bldg. Pittsburgh, Pa.

## Distributors for

ALLIS-CHALMERS Tractors and Allied Tractor Equipment  
"BERG" Highway Surfaceers  
GARDNER-DENVER Compressors and Drills  
HERCULES Road Rollers  
HOUGH-UNIVERSAL Road Sweepers  
JACKSON Concrete Placement Vibrators  
LINK-BELT Power Shovels and Cranes  
MICHIGAN 3/4-yd. Truck and Crawler Shovels and Cranes  
REX Moto-Mixers, Building Mixers, Pavers and Pumps

## C. H. ARNOLD COMPANY, Inc.

Road and Street Machinery Contractors' Equipment

726-730 Park Bldg., Pittsburgh, Pa.

## Representing

ADNUN ENGR. & MFG. CO. Blacktop Paver  
BLAW-KNOX COMPANY Blaw-Knox Co., Inc.  
BARNES MFG. COMPANY Pumps, Blis, Fin-  
ishers  
BUFFALO-SPRINGFIELD ROLLER CO. Road Rollers  
BARNES MFG. COMPANY Pumps  
THE FOOTE COMPANY Multifoot Pavers  
LITTLEFORD BROTHERS Asphalt Equipment  
PIONEER GRAVEL EQUIP. MFG. CO. Cleaning &  
Screening Plants  
SULLIVAN MACHY. CO. Compresors & Tools  
THEW SHOVEL COMPANY Shovels, Cranes, Draglines

## WESTERN MATERIAL CO.

Sioux Falls, Huron, Rapid City, Aberdeen, S.D.

Atlas Conveyors  
Blaw-Knox Company  
Bilt Stone Spreaders  
"Caterpillar" Equipment  
Gardner-Denver Co.—Car Heaters  
CMC Mixers & Hoppers  
D-A Lubricant  
Heise Lenders  
Harris Road Tools  
Hough-Universal Sweepers  
Hoist, Hoists, Yards  
LaPlant-Cheate Mfg. Co.  
Lehman Wagons  
LeTourneau Road Tools  
Linn Tractor Trucks

Member: Associated Equipment Distributors

PHILLIPS MACHINERY CO.

900 East Cary St. Richmond, Va.

## Representing

CLYDE SALES CO.  
DEWALT PRODUCTS CORP.  
ERIE STEEL CONSTRUCTION CO.  
SAUERMAN BROTHERS INC.  
CHICAGO PNEUMATIC TOOL CO.  
STEPHENS-ADAMSON MFG. CO.  
ROGERS BROTHERS CORP.  
GENERAL EXCAVATOR CO.  
AEROIL BURNER CO.  
MANITOWOC ENGINEERING WORKS  
BRODERICK & BASCOM ROPE CO.  
CHAIN BELT COMPANY

Also many other lines of Contractors' Equipment

Member: Associated Equipment Distributors

## NIXON-HASSELLE COMPANY INC.

Contractors' Equipment

Chattanooga Tennessee

## Representing

BLAW-KNOX Buckets, Forms  
INGERSOLL-RAND Com-  
pressor  
MUNOY Hoists  
AUSTIN-WESTERN Graders, Crushers, Rollers, etc.  
BARBER-GREENE Load-  
ers, Conveyors  
NORTHWEST Cranes, Shovels  
ORD—Road Finishing Machine  
CLYDE—Hoisting Engines and Derricks

Member: Associated Equipment Distributors

## SOUTHERN MACHINERY &amp; SUPPLY CO.

Roanoke Virginia

## Representing

Austin Machinery Corp. Kensington Steel Co.  
Austin-Western Road Ma. Linn Mfg. Corp.  
chinery Co. Littlefield Bros.  
Chain Belt Company Mas-Whyte Company  
Cleveland Tractor Co. Manhattan Rubber Mfg. Co.  
Columbus Conveyor Co. Division  
Coker-Wheeler Elec. Mfg. J. G. Murphy Hoisting En-  
gine Co.  
Deming Company National Superior Co.  
Gardner-Denver Co. The Oregon Company  
Gruendler Crusher & Pul- Tinkler Roller Bearing Co.  
verizer Co. Vulcan Iron Works  
Gulf Oil Mfg. Co. T. B. Wood's Son Co.  
Holtz Steel Form & Iron Co.  
Contractors' Equipment in Stock in Our  
Roanoke Warehouse

## CONSTRUCTION EQUIPMENT CO.

1118-1124 Ide Ave., Spokane, Wash.

Ideal Power Lawn Mower Co.  
Kalmazoo Railway Supply Co.

LeROI Co.

Light Air Products Co., M. &amp; M. Wire Clamp Co.

Niagara Mfg. Co., Novo Engine Co.

St. Regis Paper Co., B. F. Goodrich Co.

Sheldon Mfg. Co., Sterling Wheelbarrow Co.

D-A Lubricant Co., Sullivan Machinery Co.

Detroit Graphite Co., Sunbeam Mfg. Co.

DeWalton Products Co., Temperton, Kenly &amp; Co.

Elgin Salt Co., Fairbanks, Morse &amp; Co.

Fay-Roof-Heath Co., "William" Buckets &amp; Trailers

Gates Manufacturing Co., Wyoming Shovel Works

Homestead Valve Mfg. Co., Young Iron Works

Member: Associated Equipment Distributors

## BOEHCK EQUIPMENT CO.

2404 W. Clybourn St. Milwaukee, Wis.

## Representing

Barber-Greene Co., Universal Form Clamp Co.  
Jaeger Machine Co., Huber Mfg. Co.  
Byers Machine Co., Trackson Co.  
LeROI Co., Jones-Superior Machine Co.  
Fairbanks, Morse & Co., Youngstown Pressed Steel Co.  
W. Toeffer & Sons Co., Independent Pneumatic Tool Co.  
Holtz Steel Form & Iron Co., Greenlee Tool Co.  
Flexible Road Joint Mash, Production Equipment Co.  
Trackson Co., McCormick-Deering—Tractors  
Lidgerwood Mfg. Co., Galion Iron Works & Mfg. Co.  
Chas. Hvass & Co., Inc., Sanger Derrick Co.

Member: Associated Equipment Distributors

## DROTT TRACTOR CO., Inc.

3841 W. Wisconsin Ave. Milwaukee, Wisconsin

## Representing

ALLIS-CHALMERS Indus., KINNEY Road Oilers  
Power-Operated Elevating & Grade Graders, Motor Patrol Graders, Track Type Wagons  
PIONEER Gravel Equip., DROTT Bulldozers, Scrappers, Eliminators  
HOUGH-UNIVERSAL KOB Sand Spreaders, WAUSAU Snow Plows, DRAVEY Air Compressors, OSKOSH 4-W. Dr. Trucks

Member: Associated Equipment Distributors

## HUNTER TRACTOR &amp; MACHY. CO.

Phone: Orchard-6580 327 So. 16th St. Milwaukee, Wis.

## Representing

Aerial Borer Co., Lyne Iron Works  
American Steel & Wire Co., McKernan-Terry Corp.  
Archer Iron Works, Pacific Marine Supply Co.  
Bates Wire Ties, Pulsometer Steam Pump Co.  
R. B. Mfg. Co., Sanger Derrick Co.  
Bulwer-Wingfield Co., Sausman Bros.  
Bush Corp., Sterling Wheelbarrow Co.  
Chain Belt Co., Sullivan Machinery Co.  
Clyde Iron Works, Syntron Co.  
Euclid Road Machy. Co., Toledo Pressed Steel Co.  
Euclid Conveyor Co., Universal Form Clamp Co.  
Foster Mfg. Co., Wm. Govt. St. Seats  
Killer Mfg. Co., Ltd., Killdeer Mfg. Co., Wm. W. LeTourneau, Inc.  
Member: Associated Equipment Distributors

## JUST EQUIPMENT &amp; SUPPLY CO., Ltd.

173 Colborne Street Montreal, Que., Canada

Detroit Harvester Co., Master Equipment Co.

Brookville Locomotive Co., The W. K. M. Company

The Buda Company, Highway Truck Co.

Pleasant Grove Eq. Mfg. Co., Contractors Mach. Corp.

Blaw-Knox Company, Insley Manufacturing Co.

Euclid Road Machy. Co., C. H. E. Mfg. Co.

Wm. W. LeTourneau, Inc., Wood Hydr. Hoist &amp; Body Co.

R. G. LeTourneau, Inc., The Anthony Co., Inc.

Williamette-Nystr Co.

Member: Associated Equipment Distributors

## THE ALBERT OLSON CO., Ltd.

1148-50 Osler Street REGINA, SASKATCHEWAN CANADA

## Representing

"CATERPILLAR" Tractors, Road Equipment, Combined Harvesters  
PIONEER Gravel Equipment  
LENHART Dump Wagons  
LA PLANT-CHOATE Equipment  
KILLEFER Scrapers  
EUCLID Equipment  
P. & H. Shovels and Cranes  
PEDLAR PEOPLE'S Culverts

# Contractors and Engineers Monthly



C. &amp; E. M. Photo

The 5-mile Apalachicola Bay combined bridge and causeway in Florida, an important link in the scenic Gulf Highway which will soon extend from Galveston, Texas, to Tallahassee, Florida, will supplant the State's free ferry service. The photographs show the work of Doulut & Ewin, of New Orleans, La., one of the five contractors on this \$1,129,838.44 PWA project. LEFT, workmen in the contractor's yard at Apalachicola making the splices of the untreated and creosoted piles, using four oak splines with four bolts in each pile.

ABOVE, pile bents for one of the long wood trestles, showing the accurate batter of the outer piles made possible by the swinging leads on the pile driving barge. Note the use of saplings to tie the piles of each bent before capping. The pile-driving portion of Doulut & Ewin's contract is described on page 5.



C. &amp; E. M. Photo

R. C. Pierce, Vice President and Treasurer of Wilbanks & Pierce, Inc., of New Orleans, La., who designed the new diesel dredge Manatee which pumped 12,000 cubic yards, dry measurement, every 24 hours on the 2,200,000-cubic yard contract for widening the highway 41 between Chef Menteur and Rigollets Bridge east of New Orleans. A description of the Manatee appears on page 12.



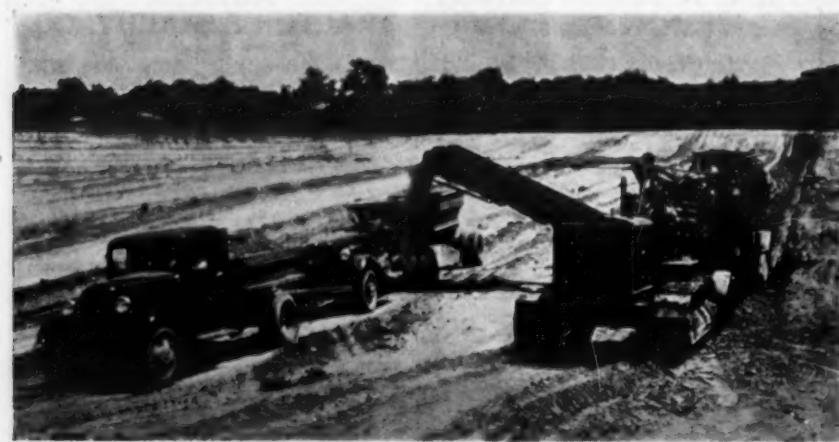
C. &amp; E. M. Photo

Ned Morris, Superintendent for Robinson & Young of Baton Rouge, La.; Theo. T. Chenet, Resident Engineer; and Paul Ott, Inspector, for the Louisiana Highway Commission on the Calcasieu River Bridge approach fill near Lake Charles, La. See description of work on page 1.



LEFT, Cecil Ruby, San Antonio, Texas, contractor, used a fleet of fourteen Ford trucks with large dump bodies, and 8-yard dump-trailers pulled by Ford V-8 tractors for hauling dirt from an elevating grader outfit working in a wide borrow pit on a road widening project near Thorndale, Texas.

ABOVE, construction equipment turns aquatic in the excavation for the sea locks at Bonneville Dam. A Northwest shovel owned by General Construction Co. loading rock to one of the fleet of International motor trucks used by the hauling contractor, D. A. Whitley of Spokane, Washington. The sea locks of the Bonneville Dam are being excavated in solid rock to permit ocean-going vessels to pass around the dam and proceed some 50 miles up the Columbia River.



Photo, Courtesy, Compressed Air Magazine

To furnish the 36,500 tons of crushed rock base for the surfacing of its 10.25-mile section of the now-famous Sky Line Drive near Luray, Va., Sammons-Robertson Co., Inc., of Huntington, W. Va., operated this Diamond crushing and screening plant during the winter and stockpiled material for spreading in the spring.